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ABSTRACT

This research project is concerned with such questions as the following: How has East Germany responded to the challenges facing education's relationship to development, especially with respect to conditions imposed by the scientific and technical revolution? What contribution has its educational and training system made to industrialization and technical progress? And, conversely, what is the impact of that system on the evolution of technology and science? Following a preface and an introduction, three sections are devoted to (1) education and employment--fundamental theoretical problems and socioeconomic conditions; (2) the relationship between training, further education, and employment; and (3) education and employment planning. Section I contains chapters on education and employment as essential elements in the social reproduction process--methodology, trends in economic growth and employment, the system of education, and development problems of education and employment. Section II contains chapters on general education to prepare for working life, career and study guidance, and aims and content of vocational-training programs. Section III contains chapters on fundamental information, the planning principle, manpower planning and planning of the educational system, harmonization, long-term planning and forecasting, and research planning. A summary and a 51-item bibligrraphy follow. (DCS)

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Education, employment and development in the German Democratic Republic

K. Korn
G. Feierabend
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A research project directed by R. Avakov

Unesco : International Institute for Educational Planning

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Preface

This volume has been prepared by a team in the German Democratic Republic, in co-operation with the International Institute for Educational Planning, within the framework of the Institute's research programme concerned with the relationships between educational and training systems on the one hand, and industrialization and technical progress on the other. The study was initiated by the IIEP as part of its mission to contribute to the exchange of national experiences concerning the rôle of educational planning in the planning of economic and social development.

The concept underlying this research project, which the Institute initiated in 1977, is the need to identify the nature of the interactions between educational and training systems and the type of society they are expected to serve, the level of development they must cope with, and the cultural and historical circumstances they both reflect and may influence. By placing the problems to be studied in differing national contexts, the Institute's aim has been to allow for comparisons between distinct structures, objectives and solutions, and to highlight the main issues at both the national and international levels.

This study thus takes its place in a series of publications on a subject of both theoretical and practical importance. The most significant fact about the German Democratic Republic's experience is that it embarked upon the path to socialism at a time when it had already reached a relatively high level of development. The object of the study, therefore, is to illustrate the concerns of the research project in a very precise socio-political and economic context. How has the G.D.R. responded to the challenges facing education in its relationship with development, especially in the conditions imposed by the scientific

and technical revolution? What contribution has its educational and training system made to industrialization and technical progress? And, conversely, what is the impact of that system on the evolution of technology and science?

The G.D.R. has acquired a distinctive experience in developing its educational and training system to meet the demands of industrialization and technical progress, in the joint planning of these two phenomena and in the search for solutions to the problems arising from the scientific and technological revolution. The study of this experience both widens and deepens our knowledge, and takes us a stage further in our understanding of a problem which lies at the very heart of one of the foremost contemporary educational issues facing all Member States of Unesco.

Sylvain Lourié
Director, IIEP

April 1984

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Introduction

This study forms part of a research project on relations between educational and training systems and development, which the International Institute for Educational Planning (IIEP) has been working on for several years now. The project is being conducted against the background of the great debates, investigations and concerns exercising the world in the closing years of the 20th century, drawing its inspiration from the real needs of contemporary societies, independently of their level of economic and technico-scientific development or socio-political system.

It is becoming increasingly necessary to study this relationship for a better understanding of development-related factors, particularly the nature and scope of the contribution made by educational and training systems to industrial and technico-scientific progress, and of the relations between these phenomena. As is well known, these systems have never in the past been as closely bound up with development processes as they are today. Nor have they ever been so heavily dependent on complex and contradictory economic, scientific and technological trends, which are in turn governed to a large extent by education and training, and by their ability to adjust swiftly and efficiently to the demands of socio-economic development, particularly to those of industrialization and technico-scientific progress.

In embarking on this project, the IIEP has been particularly concerned with the developing countries. Case studies have been initiated in five such countries (Cuba, Mexico, the Sudan, Togo and Tunisia) as well as one of the least-developed countries in Europe - Portugal. The project also embraces four socialist countries, Hungary, the German Democratic Republic, Poland and the USSR, whose wealth of experience in the area lends breadth and substance to the study.

Two general ideas serve as a conceptual foundation. First, all the case studies focus on the contributions of

education and training to development, and in particular to industrialization and technico-scientific progress. It should be pointed out here that the studies did not examine education and development in isolation, but investigated their interactions. Second, because the relations between these two phenomena obviously differed from one country to another, each country selected those aspects of the general topic that best corresponded to its specific training and development needs. But diversity of national conditions is more important in its impact on the methods employed to solve problems than in the actual type of problem that arises. In other words, diversity does not rule out the fact of a great many problems in common, throughout the international community or among a given group of countries.

The national teams appointed to prepare these case studies were invited to investigate (a) a certain number of working hypotheses formulated beforehand, and (b) specific aspects of the contribution of educational and training systems to development in each of the countries concerned, particularly methods of solving problems. The aim was thus to select and study both common and specific factors, especially problems connected with national situations and the solutions proposed to them. In Cuba, for instance, the case study dealt with the relations between secondary and higher specialist training systems and the country's principal industry - sugar. In Mexico, regional aspects were chosen as the means through which to study the relations that emerge between training, industrialization and technical progress. In the Sudan, the accent was on the training of highly-qualified specialists to meet the need for technical progress in the farms of that country. In Togo and Tunisia, priority was given to the problem of how to match vocational and technical education to the demands of development. In Portugal, two groups of industries served as the medium for a study of the relations between higher and technical education and development. Lastly, in the four socialist countries, (Hungary, the GDR, Poland and the USSR), problems were studied at the national level.

Another early idea was that these phenomena-eductional and training systems on the one hand, and economic development, particularly industrialisation, scientific and technological progress, on the other-interact permanently, so as to make it inconceivable, either in research or in practical educational planning, to neglect this complex web of tightly-interwoven relations. The question was whether a joint analysis of these phenomena and of their reciprocal impact was not a vital and fundamental condition of policy-making and planning in the field of education and training, calling for a more

thoroughgoing interpretation of these phenomena in their role as parts of the system. A conceptual or combined approach was expected to produce the new data required for improving and enhancing the effectiveness of educational and training planning connected with industrial and technico-scientific progress.

The case of the German Democratic Republic was particularly significant from many points of view for the study and understanding of this vast and complex problem. The first thing to note is that educational and training systems do not evolve in a void. Models and concepts of education, and the very nature of education, differ from one society to another, and a society and its political essence will determine the 'colour' of its educational and training systems. A country that has made a complete break with its former society in order to build a socialist society, presupposing the need to create a new educational and training model in conformity with new conditions of socio-political development as the GDR has done, is interesting as a selection among the objects of the IIEP study. Its unique situation gave this country broad scope in the formulation and implementation of fresh ideas and concepts, in the quest for new avenues to be explored and original methods of application to educational development-briefly, in a truly creative attitude toward the education of its population.

Another important feature which to a large extent governed the development of the GDR's national educational and training system, the originality of its experience in this field, the search for worthwhile forms and effective means of tying-in training with the objectives of economic and technico-scientific progress, was the creation of socialism in an economically developed country with a sound industrial and technico-scientific base. A maximum concentration on the development of the country might have compromised the system's proclaimed cultural objectives; to avoid this, the GDR embarked on a series of reforms, notably the "Integrated Socialist Education System Act" of 1965.

The higher the levels of economic and technico-scientific development and of education, the greater the complexity and diversity of the planner's tasks. One of the key aspects of the GDR's current development is the transition to an intensive model, in which concerns are increasingly of a qualitative nature. Repercussions on economic as well as on educational planning are obvious. How are the GDR's planners coping with this change?

What makes this question still more important is the great complexity of the country's demographic situation,

necessitating new kinds of solutions. Planners in the GDR were obliged to work to improve the methods and perfect the mechanisms of planning. It was necessary to take into account the close interdependence between the educational and training systems on the one hand, and industrial and technico-scientific development on the other-to reconcile the objectives and needs of two frequently competitive sectors. In the light of these considerations, the IIEP invited a team of researchers and specialists to the GDR to participate in the project by carrying out the present study:

- to examine relations between educational and training systems and economic development and technico-scientific progress in a developed socialist country;
- to identify the original features of the German Democratic Republic's experience which are of interest not only to the GDR itself but also potentially to the international community at large, and to developing countries in particular.

The task of the team was not an easy one. First, the theme is a relatively new one, and it was necessary to define a conceptual framework, a logical research design appropriate to the objectives laid down. The multidisciplinary nature of the problem made analysis more complex still. As is well known, the GDR is a dynamic, fast-developing country, and it was thus necessary to adapt the conceptual approach to these dynamic conditions, modifying and improving it in the light of rapid changes.

R. Avakov
Director of the research project

I. Education and employment: fundamental theoretical problems and socio-economic conditions

A. Education and employment as essential elements in the social reproduction process-methodology

Education and employment relate to each other through a great many connections, processes and interfaces. The system of education and the system of employment are both defined by the interplay of political, economic, social, cultural, juridical and material-technological factors under specific historical conditions; the multitude of relations between the two must not be understood as determined from one side only. The two complementary systems are of a highly dynamic nature, actively interrelated and interdependent. The framework of their relationships can be comprehended only as an integral part of a whole, and in the final analysis as an integral part of the socio-economic structure of the society.

These are fundamental statements. The objective dialectic between the comparatively independent dynamic systems of education and employment on the one hand and the social whole, its structures, determinants, means and objectives on the other is essential to understanding the current and future problems and tasks involved in the development of these systems in any society.

A socialist society is advancing in the GDR. At its present level of development, the mutual interpenetration of these two inseparably linked component parts gains more and more in importance as the relations between education and employment are shaped, both at the present time and in the future. The guarantee of a high level of education and of creative work for all people is an essential factor in personal development, and education and employment are more and more important factors in economic growth (see Karn and Maier, 1977).

1. Personal development and economic growth

Educational and employment policy are aimed at the realization of a social society (see Maier, 1972, p.258 et seq.), which will provide increasingly better objective and subjective conditions for "ensuring the highest standard of welfare and the free overall development of all members of society" and reproduce them on an ever higher level (Lenin, 1902). The effort is toward further economic growth, "to widen, to enrich, to promote the condition of the labourer" (Marx and Engels, 1848).

The real wealth of a socialist society consists in the development of the social, intellectual and aesthetic talents and aptitudes of all its members. As is well known, Karl Marx pointed out repeatedly that the purpose of economic growth under socialist conditions is "to reduce the working hours for the whole of society to an ever decreasing minimum, and thus to provide free time for all for their own individual development" (Marx, 1859).

The relation between education and employment is described by Marx as follows: the "saving of working hours means an increase in free time, i.e. time for the full development of the individual, which in turn reacts as the greatest productive force on the productive force of labour. From the angle of the direct production process it can be regarded as the production of capital fixe, this capital fixe being man himself" (Marx, 1859.)

The increase in the level of education and the intensification and utilization of the social labour potential are decisive factors for economic growth in a socialist national economy, however. The constant reproduction of education and the full employment of the social labour potential produce and reproduce the active and creative potential of a society, and is one of the fundamental preconditions for the continuation, expansion, improvement and profitability of production and consumption.

Growing productivity and quality of living labour constitute, after all, the decisive resource of a national economy. The possibilities offered by scientific and technological progress can be realized, and efficiency increased, only by living labour. The development of optimum relations between education and employment is increasingly essential to the efficiency of the national economy. Between the demands made on the educational system, and the development and utilization of the social labour potential for social production, significant quantitative and qualitative proportions within the reproduction process are determined by technological conditions, economic rationality and social circumstances.

Consequently, the theoretical analysis and the practical shaping of the interrelations between education and employment take place within the framework of an end-means dialectic which is important in terms of social policy. While the quantitative and qualitative development of education and employment, and the determination of their relationships are, on the one hand, important objectives of a socialist society, they are, on the other hand, important means of increasing the economic power which is the essential prerequisite for attaining the objective. Considered from this angle, the shaping of relations between education and employment presents itself as a special problem of relationship between social and economic progress, and implies making them efficient in both social and economic terms. These aspects are in direct correlation.

In a socialist society such as that of the GDR, social progress is the objective and the decisive moving force of economic progress. Thus the overall personal development of all members of society, the further improvement in their working and living conditions, and the securing of their social, material, and professional prospects are the criteria by which economic progress is assessed, and on which education and employment policies are based. It is obvious as well that the development of social progress substantially depends on economic progress, and on the economic efficiency and productivity of labour.

In conditions of scientific and technological progress labour, in order to be productive and economically efficient, will increasingly demand that relations between education and employment be shaped in such a way as to increase the educational potential of the country, by laying scientific and technological groundwork for future developments and by creating at the same time a highly qualified labour potential that will be able to use this scientific and technological groundwork for purposes of production. This economic double effect must be taken into account in qualitatively and quantitatively structuring relations between education and employment as a factor in economic growth.

All the above relations are complex and contradictory. To control them in the interest of social and economic progress and to develop them systematically presupposes foresight, today as well as in the future, and the avoidance of contradictions of a social character. Under socialist conditions, educational, occupational, economic, scientific and technological objectives are set along socio-economic lines-the intellectual and cultural enrichment of all members of society, social security, and the levelling of socio-economic differences. The political strategy of the unity of economic and social policies in the GDR to eliminate systematically the contradictions between economic and social progress as they

occur in the interrelations between education and employment policies, in such a way that the rapid development of the productive forces will be more directly linked with the policy of raising the material and cultural level of the people. (See Honecker 1980 a and b, p.477; Socialist Unity Party of Germany, 1976, p.22 and 1981 b, p.48 et seq.).

2. Education and employment as basic rights

In a socialist society such as that of the GDR, the guarantee of a high standard of education and a solid vocational qualification to all is an intrinsic component of its economic and political objectives; and it serves at the same time as an important means of realizing these objectives. It is, therefore, impossible to evaluate the GDR's educational system with its objectives, principles and attainments as something isolated from the requirements of its present and future employment system; nor is it possible to derive the formation of the employment system linearly and exclusively from the technological and economic requirements of economic development

Socio-economic connections which are based on the social ownership of the means of production and on the development of socialist democracy are, of necessity, linked with demands on the educational system as well as on the employment system. The development of education and employment must take place on objective, constitutional premises, which are the equal right to education and vocational qualification, and the right of all citizens to work. In the GDR these rights are guaranteed, implying certain conditions as to how to resolve all the conflicting trends in the interrelations between education and employment. The Constitution of the GDR guarantees to all citizens

- an equal right to education;
- compulsory education at the ten-year general polytechnic school;
- the right of every juvenile to learn a vocation;
- the right to work and to continuous education and vocational qualification;
- the promotion of women, in particular their vocational qualification, which is regarded as the responsibility of both society and the state;
- the promotion of young people in their social and vocational development;
- the right to co-operate creatively in the development of socialist democracy.

The Education Act of 1965 contains the principles and objectives of the integrated socialist educational system, and the basic provisions relating to its individual parts as well as to its management and planning. In that Act the principles of socialist education policy have been formulated for all levels of the educational system, for instance

- an equal right to education, irrespective of race, nationality, religious confession, sex, financial situation or social status,
- the public and social character of all educational facilities,
- free education of all types,
- the right to universal education, i.e. ideological, polytechnical, general technical, prevocational and vocational education in close connection with social life and production (see Nast, 1978, p.32 et seq.; see also Poppe, 1965, p. 170 et seq.).

The Labour Code of the GDR points out that the right of all working people to vocational training and continuous advanced training is a principle of labour law. It lays down the responsibilities of operating managers with regard to the systematic ordinary or advanced vocational training of working people, and to the vocational promotion of women and young people, and the right of the enterprise trade union committees to co-operation and co-determination in the vocational training of apprentices and the further qualification of working people. The Labour Code also contains provisions for vocational training and adult education at the enterprise level. As concerns the works managers' duty to guarantee vocational education in keeping with long-term plans and in close connection with productive work and social practice, the Labour Code also contains pertinent legal regulations concerning deeds of apprenticeship and qualification.

The Youth Act defines the duties and responsibilities which are implied in the right of young people to participate in the organization of an advanced socialist society. It emphasizes the responsibility of young people to develop into socialist personalities. It acknowledges the role of young people in a socialist society, and states in detail how to promote the initiative of young people, both workers and students. It obliges the responsible state authorities and national economic departments, as well as the managers of enterprises, industrial complexes and institutions, to co-operate closely with all mass organizations, in particular with the socialist youth organization, in the training and education of apprentices and working people.

The law concerning the Local Popular Representative Bodies and their Organs regulates the rights and obligations of the county assemblies and popular representative bodies and

their organs in the towns and communities, and in the urban and rural districts. The county and district councils plan, on the basis of indicators, the employment of the social labour potential. They are charged with balancing operations. County and district assemblies and councils must see to it that government educational policy is implemented in their regions. They ensure vocational training and career guidance in line with political, economic and social requirements. The district councils co-ordinate, control and analyze the measures taken by enterprises, industrial complexes, co-operatives and institutions in the fields of vocational training and polytechnic instruction, and organize the use of vocational training facilities other than those run by enterprises.

In every phase of the GDR's economic development, the equal right to education and the right to work have ranked high in education and employment policies; but their concrete forms and the qualitative level of their practical application in the relations between education and employment have always been dependent on the local conditions and the resources available (see Table 1).

Table 1 - Proportion of GNP devoted to education
(in millions of marks)

Year	State expenditure on education		GNP	
	Million marks	1960 = 100	Million marks	1960 = 100
1960	3 613	100.0	71 540	100.0
1965	4 351	120.4	84 760	118.5
1970	5 812	160.9	109 470	153.0
1975	8 276	229.1	142 370	199.0
1980	9 836	272.2	173 910	243.1

Source: GDR, 1981 b, p.13 and 34

The guarantee of full employment and an efficient system of education and training has required, and still requires, enormous financial, material and personnel resources. Cost-benefit ratios must be balanced anew for all decisions pertaining to education and employment policy. Development in the GDR demonstrates that, under the conditions of a socialist

society, a high degree of efficiency in guaranteed education and work for all can be achieved, even under difficult economic circumstances.

If all citizens are to be assured a high standard of general education and vocational qualification, enormous social expenditure is called for, but a high-level general education and vocational qualification are becoming an ever more important means of attaining economic growth, rising efficiency of labour, and improved conditions for individual development. This applies as well to the right to work. On the one hand, the right to work, implying real full employment, calls for a substantial contribution from society; on the other hand, a high rate of employment is today decisive in attaining social goals, and at the same time essential to the personal development of every individual.

3. Problems of proportion

In this context the proportioning of relations between education and employment is nothing but a special aspect of the task of ensuring at all times the purpose-oriented, systematic and balanced development of society at large, a task which, in a socialist society, includes not only the production and reproduction of material conditions but also the reproduction of certain social conditions. It follows that the establishment of proportions in the interrelations between education and employment is purpose-oriented within the framework of that totality of relations that determine social reproduction as a whole.

The employment system relates to the distribution of human labour over sections and branches of the national economy. The educational system is concerned with the organized acquisition of knowledge, abilities, behaviour patterns and motivations. The labour directed toward this purpose is, in turn, part of the employment system. Proportional in the relationship between the educational and employment systems thus means not only the mutual proportioning of quantitative and qualitative indices between the educational system and the employment system, but also quantitatively and qualitatively defined proportions within the two systems, which are the result of the specific nature of the reproduction and the determinants inherent in them, and play an important role. Mention must be made here of the importance of stability, continuity and the long-term character of the processes involved in the reproduction of the educational system.

The real problem of proportioning the relations between the educational and employment systems consists in the farsighted recognition and elimination of contradictions, and the maintenance of the stability and continuity of both systems. Contradictions which are greater in societies and economies developing under the influence of rapid scientific and technological progress arise, for instance, between the actual and the necessary level of education and qualification of the labour potential, and between this necessary level and the quantitative and qualititative capacities of the educational system. They must be eliminated so that the national economy will not suffer losses, and economic and social development will be the most efficient possible.

The educational system is a sphere of social reproduction in which labour is consumed to satisfy the specific need. The higher the economic level of a country, the more resources can be earmarked for meeting this need. But the educational system is not only a consumer of labour. The consumption of social labour which occurs is at the same time the production and reproduction of the social labour potential in accordance with the necessary educational level of society and with the corresponding structure of education and qualification.

Thus the educational system increases the productive potential of the social labour potential, and contributes to the improvement of efficiency and productivity of labour. According to Marx's theory of the value of labour, an increase in education and qualification means an increase in the potential of labour in terms of value and of production. But this is true only if the increased qualification is fully utilized.

A level of education and qualification which does not fulfil the requirements of the workplace, both qualitatively and quantitatively, tends to result in insufficient use of technology, in the inappropriate handling of tools and machinery, in their premature attrition, in overlong periods of vocational adjustment and too little mobility. On the other hand, a qualification level which is above the requirements of the workplace may result in an economic loss and in personal frustration. In economic terms, education and qualification are significant only if applied; unused education and qualifications will atrophy and become obsolete as science and technology progress. The amount of time spent in attaining this education will be, at least in part, squandered.

It is only under the condition that the level and the scope of the education of the labour force fulfil the requirements of the reproduction process that we can speak of proportion in the interrelations between education and

employment. Labour must be used in the system of education in such proportions that the educational level of the labour force needed for social reproduction will be ensured, and its distribution appropriate. In other words, the relationship of the educational system with the employment system is essential to the overall process of social reproduction. It shares in the distribution of labour not only as a consumer, but as a sphere of the national economy which plays an active role-via the qualitatively expanded reproduction of the social labour potential-in the national economic reproduction process (see Korn/Maier, 1977, p.20 et seq.).

The problem of proportioning the relations between education and employment is made even more difficult by the fact that the educational structure of the social labour potential, which is horizontal as well as vertical, must correspond to a highly differentiated structure of manpower requirements in the national economy; and the labour potential develops according to its own laws. Another complicating factor is time, which is of qualitative significance in the reproduction of the education system on the one hand and of the employment system on the other.

The determination of the structure of the necessary requirements presupposes an assessment of the development of the various sectors of the national economy, the production methods to be applied, and the extent to which they will be applied. To determine all these relations presupposes in turn a knowledge of exactly which educational structure of the social labour potential is needed. In addition, the educational structure is also closely connected with the development of society as a whole.

The establishment of a long-term balance between education and employment is thus a complex socio-economic problem Its continuous, systematic solution under socialist conditions must be based on the efforts of the working people to raise their material and cultural standards, and these include their interest in more and better education and training as well as in socially useful and significant work.

B. Trends in economic growth and employment

Relations between education and employment and their further systematic development must be considered from the point of view of the level reached now, and an economic strategy must be outlined for the 1980s.

1. The economic strategy

One of the objectives of the economic strategy of the GDR is to make the potential of the scientific and technological revolution the direct and principal reservoir feeding our efforts to improve the performance of the national economy. Plans for the 1980s are based on the high dynamics of social production and of the gross national product. This strategy aims at and promotes the further rapid increase in production. A high rate of growth can be maintained in the years to come, mainly by making use of qualitative growth factors.

The GNP is expected to increase by 28 to 30 per cent between 1980 and 1985; the same applies to the manufacturing output of the nation. Output in the construction industry should increase by 23 to 25 per cent; crop production by 5 to 6 per cent. The performance of the transport sector is expected to rise by 11 to 12 per cent in terms of goods transported.

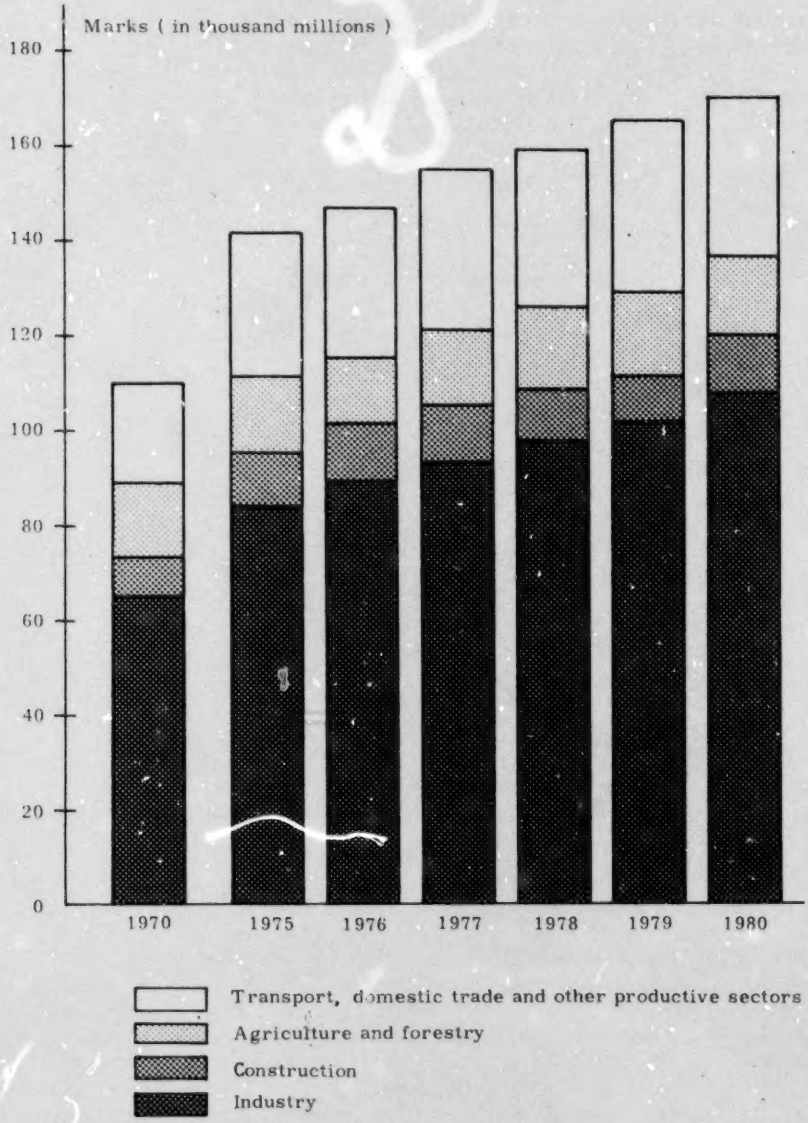
These rates of increase imply a continuation of the successful development of the past few years (cf. Table 2 and Fig. 1).

Table 2 - Economic development in the GDR (1971-1980)

	1971 to 1975	1976 to 1980	Comparisons (in per cent)
	(in thousand millions of 1983 marks)		
National income	640	813	125
Manufactured goods	1039	1625	132
Construction	118	154	127
	(in millions of tons of feed)		
Plant and animal production	231	239	104
	(in thousand million tons)		
Goods transported	4.3	5.4	126

Source: GDR, 1981 b.

Figure 1 - GNP 1970-1980



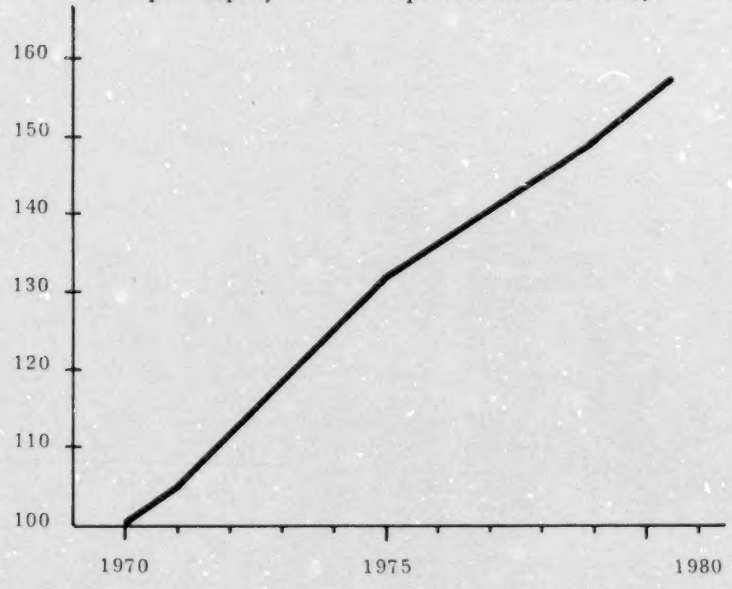
Source: GDR, 1981 b

These objectives for the 1980s make it necessary to proceed from an intensively expanded reproduction of the national economy. The production sphere will have to get along without any increase in manpower in the future. For this reason alone, overall national economic productivity must be increased faster than production. Relevant development trends in past years are shown in Figures 2 and 3.

Figure 2 - Index of labour productivity

1970 = 100

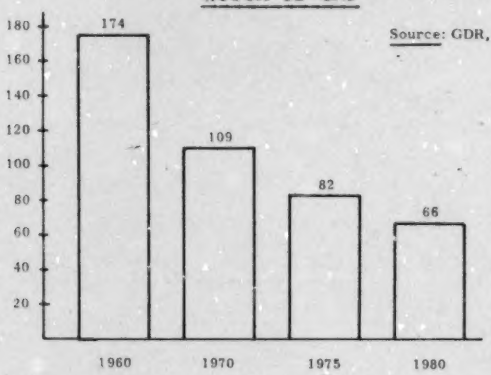
(GNP per employee in the productive sectors)



Source: GDR, 1981 b.

In the coming years scientific and technological progress will increasingly become the decisive factor in national efficiency and economic growth; this implies fundamental qualitative changes in the whole reproduction process. It is obvious that the sources of efficient economic growth will change more and more, so that economic growth will be based not so much on a predominantly quantitative expansion of the resources of working hours, fixed assets, and raw materials, but rather on a continuous increase in efficiency.

Figure 3 - Employee hours required to produce 1,000 marks' worth of GNP



Source: GDR, 1981 b.

Increasing the economic effects of science and technology will be the key to increasing the national economic efficiency in the 1980s, and progress in science and technology will in turn affect the process of raising labour productivity and intensifying its efficiency. The share of labour productivity in industry brought about by scientific and technological achievements rose from 55 per cent in 1975 to more than 95 per cent in 1980. Ensuring the high quality of our products throughout the national economy is important in this strategy, and we must draw on the most advanced scientific and technological findings in developing new products. In this way we can also significantly increase the efficiency of labour.

Under this economic strategy, the interrelations between economic performance on the one hand and the satisfaction of material and cultural needs, together with the development of education and the overall improvement of the living standard of the people on the other, are becoming more and more important. The transition of the national economy to one of intensively expanded reproduction, which is going on now and will be solidified during the 1980s, has a bearing on the relations between education and employment in the GDR.

2. Demographic processes

In the years to come, demographic processes in the GDR will result in a substantial reduction in the number of young skilled workers taking vocational training. Workers will have to be released to assume other duties. The specific nature of the social labour potential in the GDR, and its development and structure, are characterized mainly by three factors: a unique

demographic situation, high rate of employment, and a highly developed qualification structure.

In spite of stagnancy and a seriously deformed age structure in the population due to the effects of World War II, the GDR has attained a high degreee of efficiency over the past few years (see Table 3).

The working-age population decreased disproportionately, mainly through demographic processes. Nevertheless the number of working people rose from 7,313 thousand in 1948 to 8,184 thousand in 1979.

Table 3 - Proportion of the resident population of working age (in thousands)

Year	Resident population	Working-age population			Proportion (in %)
		Total	Males	Females	
1950	18 388.2	11 781.9	5 253.9	6 528.0	64.0
1955	17 832.2	11 382.5	5 220.8	6 161.7	63.9
1960	17 188.5	10 542.1	4 961.1	5 581.0	61.3
1965	17 039.7	9 916.3	4 789.3	5 127.0	58.3
1970	17 057.0	9 865.9	4 860.7	5 005.2	57.8
1975	16 820.0	10 046.0	5 031.0	5 015.0	59.7
1978	16 751.0	10 427.0	5 198.0	5 229.0	62.3
1979	16 740.0	10 409.0	5 248.0	5 161.0	62.2

Source: GDR, 1981 b.

The development of the social labour potential in the GDR indicates a trend which, at first glance, appears contradictory. Although the demographic trend is downward and the number of people of working age has declined temporarily, the number of employees is rising (see Tables 4 and 5). The decrease in the number of working people could be reversed, notably through an increase in the rate of employment of women. In 1970 about 80 per cent of all women were gainfully employed, and in 1976, 86 per cent were gainfully employed (see Table 6).

Table 4 - Distribution of employees by economic sector excluding apprentices (in thousands)

Year	Total	Manufacturing	Crafts	Construction	Agriculture
1949	7 313	1 990	630	474	2 242
1955	7 722	2 542	506	435	1 721
1960	7 686	2 768	414	470	1 304
1965	7 676	2 796	393	455	1 179
1970	7 769	2 856	404	538	997
1975	7 948	3 036	269	557	895
1979	8 184	3 121	258	580	876

Source: GDR, 12980e.

Table 5 - The labour force (excluding apprentices) by sector (in percentages)

Sector	1950	1960	1970	1975	1978	1979
Manufacturing	29.2	36.0	36.8	38.2	38.2	38.1
Crafts	8.3	5.4	5.2	3.4	3.2	3.2
Construction	6.5	6.1	6.9	7.0	7.1	7.1
Agriculture & forestry	27.9	17.0	12.8	11.3	10.8	10.7
Transport, post & telecommunications	6.3	7.2	5.8	5.8	5.8	5.8
			1.7	1.8	1.7	1.7
Trade	9.4	11.6	11.0	10.6	10.4	10.3
Other branches of production		1.2	2.3	2.9	3.1	3.2
Non-productive branches	12.5	15.5	17.5	19.0	19.7	19.9
Total	100	100	100	100	100	100

Source: GDR, 1980e.

Table 6 - Percentage of female employees by sector
(in percentages)

Sector	Percent of female employees in sector's workforce				Percent of female workforce in the sector			
	1970	1975	1978	1979	1970	1975	1979	1979
Manufacturing	42.5	43.7	43.8	43.7	32.3	33.6	33.4	33.2
Crafts	40.1	38.7	38.6	38.7	4.3	2.6	2.4	2.5
Construction	13.3	14.9	16.2	16.2	1.9	2.1	2.3	2.3
Agriculture & forestry	45.8	42.9	42.6	42.2	12.2	9.7	9.2	9.0
Transport, post and telecommunications	68.8	70.5	70.9	70.6	2.5	2.5	2.4	2.3
Trade	69.2	71.4	72.8	72.9	15.8	15.3	15.1	15.0
Other branches of production	53.7	54.2	54.8	55.3	2.6	3.2	3.4	3.5
Non-productive branches	70.2	72.3	72.7	72.8	25.4	27.8	28.6	29.0
GDR total	48.3	49.6	50.1	50.1	100	100	100	100

Source: GDR, 1980e.

The total of gainfully-employed persons increased over the same period, and the percentage of workers and salaried employees rose. Particular attention should be drawn to the fact that the number of people with higher education employed in the economy has increased (see Tables 7,8 and 9).

The practical application of the right to work, and full employment, increased the number of gainfully-employed persons between 1949 and 1977 by a total of 740,000 (excluding apprentices), though the population remained stable and the number of people of working age went down. In industry alone, more than one million new jobs were added.

The structure of qualifications and education has been subject to continuous and fundamental change since the founding of the GDR. In 1949 about 75 per cent of all working people were either unskilled or semi-skilled; today these catgegories comprise 20 per cent of the employed population (see Fig.4 and Table 10). When all educational privilege was abolished, the

Table 7 - Socio-economic employment structure

Category	1955	1979	1955	1979
	1,000		Percentage	
Total employees (including apprentices)	8 188.0	8 684.3	100	100
Workers and salaried employees (including apprentices)	6 415.9	7 761.7	78.4	89.4
Members of production co-operatives	192.8	740.4	2.4	8.5
including:				
co-operative farms (LPG)	190.2	564.3	2.3	6.5
craft co-operatives (PGH)	2.4	152.2	0.0	1.8
Owners of semi-state enterprises and commission dealers	-	26.1	-	0.3
Others	1 579.2	156.1	19.3	1.8
including:				
private farmers and private gardeners	1 028.9	6.3	12.6	0.1
private craftsmen	320.0	113.7	3.9	1.3
private wholesale and retail traders	148.3	12.4	1.8	0.1
self-employed professional people	33.9	10.6	0.4	0.1

Source: GDR, 1980e.

Table 8 - Comparison of the number of university, college and technical school graduates employed in the GDR, 1961-1979

(1961 index = 100)

Year	Total	Manufacturing	Agriculture & forestry	Transport, posts & telecommunications	Trade	Non-productive branches
university and college graduates						
1961	100	100	100	100	100	100
1970	201	319	201	316	378	179
1979	373	813	369	893	935	251
technical-school graduates						
1961	100	100	100	100	100	100
1970	191	250	184	295	654	150
1979	379	395	283	462	1 346	321

Source: GDR, 1981b.

Table 9 - University, college and technical school graduates per 1,000 persons employed in the GDR 1961-1979

Year	Total	Manufacturing	Agriculture & forestry	Transport, posts & telecommunications	Trade	Non-productive branches
			university and college graduates			
1961	21.8	6.0	4.9	2.8	2.0	103.0
1965	30.9	10.4	7.4	5.8	4.3	129.7
1975	55.3	27.9	19.8	18.8	13.0	178.3
1979	65.0	35.6	24.2	22.8	17.5	192.0
			technical school graduates (1)			
1961	39.0	27.7	16.2	13.8	3.7	128.9
1965	54.8	42.3	24.0	24.7	11.1	154.0
1970	68.2	56.5	36.1	40.6	24.4	156.7
1975	86.0	71.0	52.4	53.2	37.6	173.2
1979	118.3	79.9	61.0	57.6	46.6	305.2

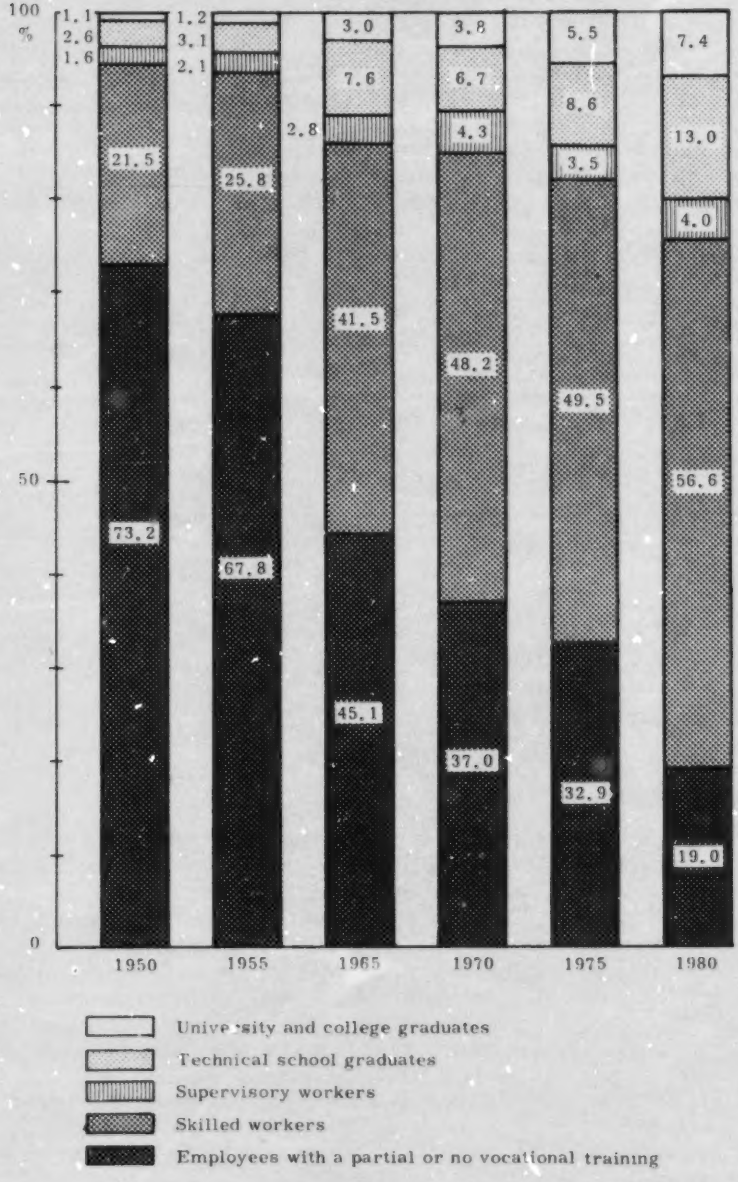
Source: GDR, 1981b.

(1) The increase in the number of technical-school graduates employed in the non-productive sector is mainly due to the fact that from 1975 onwards one of the former skilled-workers' professions in public health, nurses' training, has been incorporated in technical schools. See also pages 81-84.

old structures were given a new quality. Present and future developments will have the following salient effects:

(a) the proportion of skilled workers will stabilize at a level between 60 and 65 per cent; any other changes will be mainly in qualitative development, such as an increase in the percentage of skilled workers with ten-year schooling and additional training, and increased emphasis on scientific and technological acumen in certain trades and jobs in which skilled workers are employed.

Figure 4 - Qualification structure of employment in the GDR, 1955 - 1980



(b) the proportion of university, college and technical school graduates will continue to increase, but at a slower pace; the proportion of college and technical school graduates is expected to exceed 20 per cent by 1990.

(c) the proportion of semi-skilled and particularly unskilled workers will continue to decrease.

By the year 2000 the proportion of skilled workers is likely to be 65 per cent of the labour force, and that of university, college and technical-school graduates approximately 25 per cent. During the same period, there is a chance of reducing the proportion of unskilled and semi-skilled workers to less than 10 per cent.

Table 10 - Distribution of employees who have completed vocational training (in thousands)

Year	Total	University and college education	Technical school education	Supervisory workers' training	Skilled workers' training
1971	3 982.3	278.9	482.8	224.1	2 996.6
1975	5 105.2	398.9	620.3	254.0	3 832.1
1976	5 364.2	425.9	772.5	257.9	3 907.9
1977	5 502.1	444.7	809.2	260.6	3 987.6
1978	5 715.2	466.9	851.2	267.7	4 129.4
1979	5 866.0	484.6	882.2	273.5	4 225.6

3. Factors in the reproduction of the social labour potential

What we understand by social labour potential is the totality of the knowledge, abilities and skills of the working members of society that can be applied in the labour process. It follows that we distinguish between potential and utilized labour. Whereas the labour potential covers all persons of working age, whether they are at work or not, utilized labour includes those members of society who are actually employed in the reproduction process of the national economy. To give the labour potential a structure that can be efficiently used is a task of high priority within social planning, not only in its economic context but in its social and sociological aspects. In other words, the social labour potential is reproduced so as to find the most effective ratio between potential and utilized social labour.

The necessity for a more efficient utilization of the social labour potential is seen in the fact that only 62 out of every 100 citizens of this country are of working age, 17 per cent being old-age pensioners and 21 per cent children under 15 years of age.

In the GDR the planned reproduction of the labour potential is regarded not exclusively as a central economic category. In keeping with the socio-economic basis of society, special attention is attached to the processes of developing the necessary physical, cultural and social quality in the labour potential, to its well-rounded, scientifically based general education, and to vocational qualification.

All the other elements of the labour process are concerned solely with the extent to which physical and moral wear and tear occur; the process of expanded reproduction involves the constant accumulation of knowledge and skills as well. The level of qualification of the employee is maintained and continuously increased in the process of working and learning, presupposing a vocational outlet in accordance with the qualifications acquired. Thus the need of the individual employee for social as well as intellectual and cultural activity is met.

The basic task in relating education and employment consists in harmonizing the structure of education and qualification with the structure of the requirements of the labour process; but not all problems raised by the dynamics of education can be reduced to the relation between education and the requirements of work. The difference between "education" and "qualification" might be stated as follows: Qualification is related to work. It involves the abilities, skills, and knowledge required to do a socially useful job. Education must be understood as an independent value, a quality distinguishing a personality. But we cannot ignore the important relationship between general education and vocational qualification.

Qualification is, of necessity, determined by the character of the job as well as by the standard of education and upbringing of the employee. Qualification is acquired through specific training, and consolidated, deepened and improved by continued advanced professional training; it is that part of education that is directly disposed of in the labour process.

Representing the totality of the knowledge, skills and abilities that may be applied by working people in the labour process, the level of qualification directly determines the labour potential that is available or active in the national economy. It is true also that any increase in qualification will make itself felt as a rise in educational level. The

active function of the qualification level must be emphasized; it contributes to overcoming the vestiges of the previously prevailing division of labour, the monotony and narrow limits of work, and it leads to a higher degree of flexibility and mobility.

The important connection between the qualification level by which the knowledge, abilities and skills of working people are measured on the one hand, and labour productivity on the other, is treated extensively in the literature. At least of equal importance, particularly to a socialist society, is the connection between qualification and social activity. Sociologists have demonstrated that levels of education and qualification directly affect social activity-the motivation and the ability of working people to participate in managing and planning social processes.

The efficiency of the educational effort in the GDR is decisively reflected in the rapid increase in the segment of skilled workers among the total working population. Between 1965 and 1970 one million skilled workers were added; between 1971 and 1975 the figure was 1.3 million, and another 1.4 million were trained between 1975 and 1980. By 1978 fully half the employees in the GDR had completed skilled training, and one out of every six skilled workers was qualified in more than one trade.

About 34 per cent of university-educated employees start out in a skilled trade; 73 per cent of those with technical-school background, and 100 per cent of the supervisory workers, have first been trained as skilled workers. In 1978 a third of all skilled and supervisory workers raised their qualifications by participating in continuing education schemes.

The trend towards future increase in production in the GDR will depend largely on increases in efficiency, which are of the greatest importance to the reproduction of the labour potential. This is why production must rise faster than expenditure in mechanized and human labour.

Our economic strategy is also directed towards comprehensive rationalization, which is centred around at least three aims which are closely inter-connected: to save man-hours, to raise the quality of workmanship, and to improve working conditions by continuing systematically to eliminate jobs which are detrimental to health, involve heavy physical labour, or are monotonous.

The measures of comprehensive rationalization are intended, inter alia, to save a total of 2,854 million working hours in the national economy in the five years from 1981 to 1985. This would correspond to the work done in a year by more

than 300,000 workers. In the period 1976 to 1980 we saved a total of 1,664 million hours, or the year's labour of 180,000 workers. Our investment policy over the next few years must ensure the saving of more workplaces rather than the creation of new ones, i.e. the total of all investments must result in a reduction in workplaces (see Socialist Unity Party of Germany, 1981b, p.56 et seq.).

Quantitative and qualitative improvement in the utilization of the social labour potential plays an eminent role in this process, and education, qualification and advanced professional training become more and more important in labour performance. The performance of the production worker is, in principle, determined by the developmental stage of science and its level of technological applicability; but the connection between the standard of education and qualification on the one hand and the utilization of the findings of scientific and technological advance in the form of effective instruments of labour and technologies on the other is also increasingly evident. Education and qualification increasingly influence the division and combination of labour, and the degree of specialization and co-operation. Last but not least, increasing weight must be attached to the worker's social awareness and activity. The need for long-term and harmonized planning of education for the development of the labour potential will remain in the future, but it is also essential to ensure the efficient use of current levels of education and qualification. These reserves constitute the major source of increment of value, through ever better workmanship. Increase in the efficiency of relations between education and employment coincides with the economic need to effect great changes in the production profile of the national economy, and to provide optimum conditions for the manufacture of highly refined products.

C. The system of education

The Integrated Socialist Educational System Act of 1965 introduced a far-reaching educational reform into the GDR which resulted in an educational system now characterized by a high degree of efficiency and adaptability. On the basis of a new orientation in education and training, the system now provides young people with a high level of modern, scientifically-based general education, and with a vocational qualification which is in keeping with the identifiable requirements of continued social and economic development.

1. Uniformity and differentiation

Under the Integrated Socialist Education System Act of 1965 and the Constitution of the GDR of 1968, the ten-year general polytechnic school (short form: comprehensive school) is compulsory and free of charge for all children. Except for the physical education classes in the intermediate and upper grades, the schools are coeducational.

All children have the right and the duty to attend the comprehensive school up to rough completion of the 10th year. The comprehensive school lays the foundation for subsequent training and further instruction of all types. General education at the ten-year comprehensive schools and the twelve-year secondary schools includes education in mathematics, natural sciences, civics, social sciences, German, foreign languages, arts, sport, and polytechnic training (see Tables 11 and 12).

Table 11 - Subjects taught at the general polytechnic (comprehensive) schools

(in percentages)

Mathematics and natural sciences	29.8
Polytechnic training	10.6
Social sciences, German, literature, arts	41.1
Foreign languages	10.6
Sport	7.9

Facilities for the training of skilled workers, along with technical schools, colleges and universities, prepare young people for their future jobs. They also deepen and improve knowledge in important spheres of general education.

Education at all institutions is linked with practical application of what is learned. Theory is combined with practice; pupils, apprentices, and students alike learn and study while simultaneously doing productive work, so that their work is creative, and their knowledge, abilities, and skills constantly improved.

All educational institutions see their task as educating and training young people who will be equipped with solid knowledge and skills and be able to think and act creatively. Their objective is the education of universally

Table 12 - Weekly schedule of the ten-year general polytechnic (comprehensive) school

Subject	1	2	3	4	5	6	7	8	9	10
German	10	12	14	14	7	6	5	5	3	4
Russian	-	-	-	-	6	5	3	3	3	3
Mathematics	5	6	6	6	6	6	6	4	5	4
Physics	-	-	-	-	-	3	2	2	3	3
Astronomy	-	-	-	-	-	-	-	-	-	1
Chemistry	-	-	-	-	-	-	2	4	2	2
Biology	-	-	-	-	2	2	1	2	2	2
Geography	-	-	-	-	2	2	2	2	1	2
Manual instruction	1	1	1	1	-	-	-	-	-	-
Gardening	1	1	1	1	-	-	-	-	-	-
Polytechnic courses in 7th to 10th year	-	-	-	-	-	-	4	4	5	5
Including:										
Introduction to socialist production	-	-	-	-	-	-	(1)	(1)	(2)	(2)
Technical drawing	-	-	-	-	-	-	(1)	(1)	(-)	(-)
Productive work	-	-	-	-	-	-	(2)	(2)	(3)	(3)
History	-	-	-	-	1	2	2	2	2	2
Civics	-	-	-	-	-	-	1	1	1	2
Drawing	1	1	1	2	1	1	1	1	1	-
Music	1	1	2	1	1	1	1	1	1	1
Sport	2	2	2	3	3	3	2	2	2	2
Weekly hours	21	24	27	29	31	33	32	33	31	33
Optional:										
Needlework	-	-	-	1	1	-	-	-	-	-
2nd foreign language	-	-	-	-	-	-	3	3	3	2
Weekly hours	21	24	27	30	32	33	35	36	34	35

and harmoniously developed personalities who consciously shape social life, and lead full and happy lives worthy of human beings (Article 1 of Integrated Socialist Education System Act).

During the first ten years, which we refer to as the comprehensive school, the system and objectives are standardized throughout the country. In conformity with social requirements and individual talents, differentiations in education begin at the level of the secondary school. The criterion for admission to college and university studies is performance, but the social structure of the population is taken into consideration. Education is pertinent to all social forces. Their common starting-point is the goal of socialist society: to effectively increase the satisfaction of the material and intellectual needs of all citizens.

Current planning of education in the GDR must proceed from the thesis that the construction of an integrated socialist education system is basically completed, this thesis being important also for the development of the labour potential. At present 92 per cent of all children of pre-school age attend a kindergarten; about 94 per cent of all pupils continue learning at the comprehensive school up to the 10th year rather than the 8th, which was compulsory before 1965. Approximately 90 per cent of all young people receive vocational training; 25 per cent receive technical school or college education.

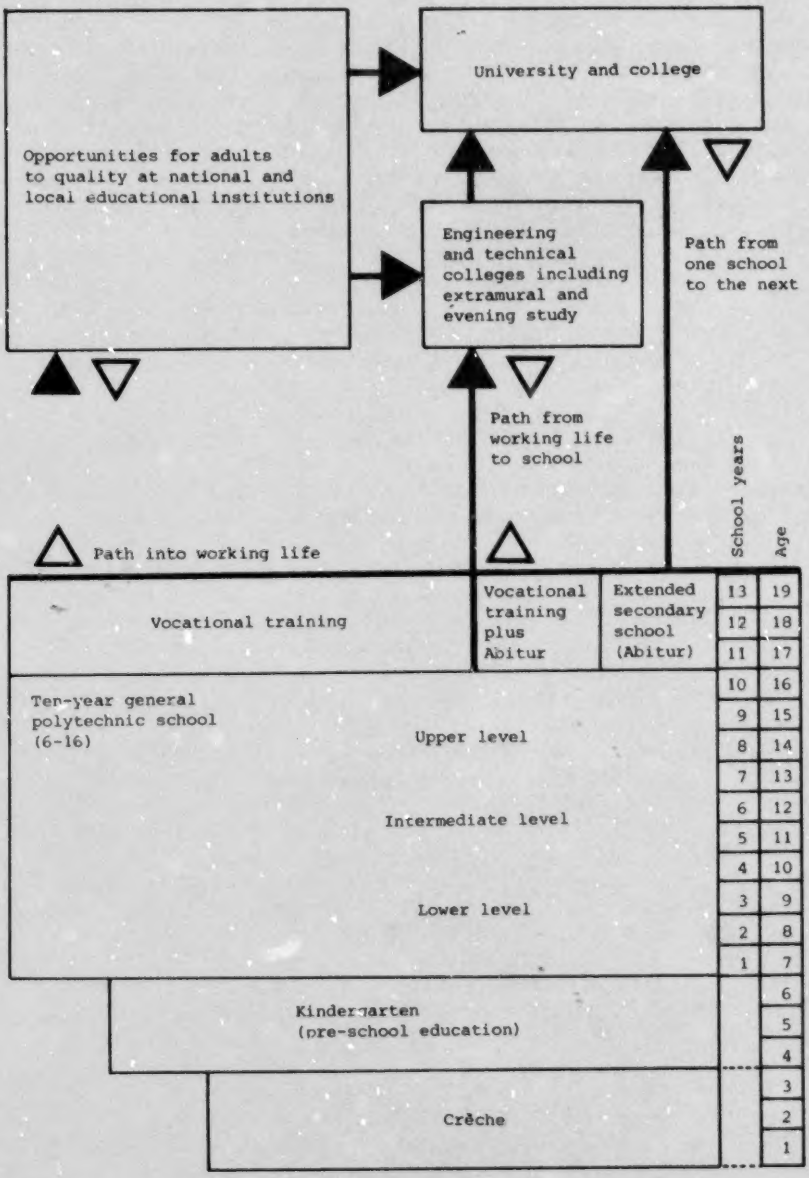
Further educational reform is unnecessary in the period ahead of us. The current system is flexible enough to respond to new requirements and conditions of social development and to changes in educational needs, and will remain stable for some time. The general educational and vocational qualifications which are provided on the basis of new education and training guidelines at the ten-year comprehensive school, vocational schools, technical schools, universities and colleges meet the identifiable requirements for accelerated scientific and technological progress of an advanced socialist society.

2. The network of educational facilities

The fundamental elements of the integrated socialist educational system as laid down by law are (see Fig.5):

- institutions for pre-school education;
- ten-year general polytechnic (comprehensive) schools;
- institutions for skilled training;
- institutions that prepare students for university entrance;
- technical schools;
- universities and colleges;
- institutions for the continued training and education of working people.

Figure 5 - Structure of the integrated socialist educational system


University and college
Opportunities for adults to quality at national and local educational institutions
Engineering and technical colleges including extramural and evening study
Path from one school to the next
Path from working life to school
Path into working life
School years
Age
Vocational training
Vocational training plus Abitur
Extended secondary school (Abitur)
Ten-year general polytechnic school (6-16)
Upper level
Intermediate level
Lower level
Kindergarten (pre-school education)
Crèche

Physically and mentally handicapped children are taught in special schools.

In the sixties and 1970s, educational planning was faced with the tasks of extending development at all levels of the educational system. This development was marked by the gradual application of the principles of raising the level of general education of all children, placing more of them in the Abitur (matriculation examination) classes, and rapidly increasing the number of technical school and university students. This went hand in hand with expansion of the network of education facilities, provision of additional training facilities and more accommodation in hostels, and it meant a corresponding increase in the labour potential in education, and rapid growth of education and its share in the GNP.

As a result of this development the system of education of the GDR has a highly qualified pedagogical labour potential at its disposal, and close agreement between requirements and employment. A fully developed network of educational facilities, ranging from kindergartens to universities and colleges, has been established, closely matching the available to the necessary capacities. This network is built up in such a way that, generally speaking, it need not be changed for a long time to come even if the numbers of children fluctuate.

Today, any child between three and six years of age can attend kindergarten if the parents so desire. There were about 2,300,000 pupils attending the comprehensive school on 15 September 1980, with 5,900 general schools at their disposal, including the advanced level (extended secondary school), special schools for physically and mentally handicapped children, and schools for particularly gifted pupils, with a total of 114,700 classrooms. The average number of pupils per class dropped from 27 in 1970 to 25 in 1975 and 22 in 1980. The teacher-pupil ratio was 1 : 19 in 1970, 1 : 17 in 1975 and 1 : 14 in 1980.

Skilled training for a total of 452,200 apprentices is provided at 981 vocational schools (727 run by enterprises and 254 by municipalities). One in every four apprentices in the GDR lives in one of the 1,340 enterprise-run or municipal hostels for apprentices (see GDR, 1980a).

At present, the educational system of the GDR includes 233 engineering institutes and technical schools with specialized training programmes, distributed (in 1976) as follows (see GDR, 1979a, p. 123 et seq. and p.130):

	%
63 technical schools for paramedical staff	= 26.6
52 engineering institutes	= 23.2
48 technical schools for educational staff	= 20.6

38 technical schools of agriculture and forestry	= 16.3
12 technical schools of arts	= 5.2
8 technical schools of economics and civics	= 3.4
7 other technical schools	= 3.0
4 technical schools of engineering and commercial pedagogics	= 1.7

The engineering institutes and technical schools in this country train students in 244 special subjects. They dispose of a wide network of more than 500 branch offices in large towns, dense industrial areas, and sometimes in major enterprises, where they constitute a tremendous advantage for the economic organization of external studies.

The present system of universities and colleges developed during the process of transformation of society. Information on the number and size of universities and colleges is given in Tables 13 and 14.

Table 13 - Number of universities and colleges

Educational facilities	1939	1951	1960	1970	1980
Universities	6	6	6	6	6
Technical universities and colleges	2	3	10	19	18*
Medical academies	-	-	3	3	3
Colleges of agriculture and forestry	1	-	2	2	2
Colleges of economics and law	2	2	3	3	3
Colleges of normal and physical education	-	2	9	10	10
Colleges of the arts	5	8	11	11	11
Total	16	21	44	54	53

Note:* In 1977 the College of Construction and the College of Engineering were united to form the College of Technology in Leipzig.

Source: GDR, 1980c.

The processes of expansion continue. Quantitative expansions are mainly catching up on backlogs and meeting requirements of demographic development; they are centred on priorities and are differentiated. In the 1980s, however, more attention will be paid to tasks which contribute to higher efficiency in the educational system, and increased quality in the educational processes and performance. One task consists in further improving the working, learning and living conditions in the educational sphere, calling for a purpose-oriented increase in the qualifications of the available labour potential in education. It calls for more efficient, expanded, and modernized utilization of this potential, the existing premises, and other materials, in particular educational, scientific, and technological equipment. Generally speaking, emphasis is placed on more efficient use of those existing facilities that are appropriate for raising the efficiency of educational processes. These are strategies which will apply in the 1980s, and probably in the nineties as well.

Table 14 - Sizes of universities and colleges by the number of full-time students enrolled

	1939	1951	1960	1980
Up to 500 students	8	12	17	14
501 - 1,000 students	5	2	12	7
1,001 - 2,500 students	2	2	8	21
2,501 - 5,000 students	-	3	4	5
5,001 - 7,500 students	-	2	-	2
7,501 - 10,000 students	-	-	2	1
more than 10,000 students	-	-	1	3

Source: GDR, 1980c, p.37.

3. Development trends

Over the past few years the construction of the present educational system has already influenced the direction and pace of all the fundamental processes involved in developing a socialist society in the GDR-the development of social awareness, the strengthening of performance throughout the national economy, the development of the social structure, and the fulfilment of material and intellectual needs.

Moreover, the attainments of the education system have had considerable effect on the structure of the social labour potential in the GDR (see Table 15).

Table 15 - Qualification structure of the active labour force in the GDR (in percentages)

Year	University or college graduation	Technical-school graduation	Skilled workers	Partial training, semi-skilled, without completed training
1946	0.6	1.3	44	54
1971	4	7	55	34
1980	6	13	58	23
1990	8	15	59	18

Source: Wolter, 1977, p.53

The data given for 1990 must be understood as the probable lower limit of development. It characterizes a trend which corresponds, in principle, to requirements for the further development of society. Relations between education and employment will, therefore, be subject to new conditions which have been created, to a great extent, by the educational system itself. It can be stated that, in terms of the 1970s, the lag in filling the actual need of society for qualifications has been caught up. The share of technical-school, university or college graduates in the total of the labour force is now sufficient-an important element in the transition to expanded reproduction of the national economy.

In the years to come the further development of the whole educational system will be heavily influenced by demographic processes, which must be taken into account in educational planning. At present, the simple maintenance of the population levels is assured, though birthrates are somewhat unstable. Added to this, the past few decades have been marked by a continuous decline in the fertility rate(1). This decline was particularly conspicuous in the first half of the 1970s; in the late 1970s it began to rise again (see Table 16).

(1) The fertility rate (number of children per 1,000 women of child-bearing age) in the GDR was 83.9 in 1960; 70.1 in 1970; 51.9 in 1974; 63.1 in 1977.

Table 16 - Birthrate (live births) in thousands, 1955-1979

Year	Number	Year	Number
1955	293	1972	200
1960	293	1974	179
1965	281	1975	182
1970	237	1978	232
		1979	235

Source: GDR, 1981b.

Birthrates will change in the future as well. In the nineties at the latest there will again be a downtrend, although the fertility rate will continue to rise. This will be so because persons born in the 1970s, when the birthrate was low, will be producing children. This change in the numbers of children and young people to be educated and trained is the reason for the increasing importance of the time factor in the planning of education as a whole.

The interval between the time when the children of a "baby-boom" generation begin to attend kindergarten and their attendance in secondary school or university is 12 to 14 years. In the 1980s and nineties the system of education will be faced with complicated problems due to the rapid and wide change in the number of births. The baby boom of the early sixties is making itself felt in the early 1980s; young people of that generation are completing their education at the comprehensive school and taking up vocational training. The generation of the low birthrates of the first half of the 1970s are in the comprehensive school, and will be dispersed throughout the various levels of vocational education until the end of the nineties.

The effects of this demographic development on pre-school and comprehensive education in the 1980s are already clear and can, in general, be determined in advance. The main problem is the adaptation of the school system to the period when the low-birthrate generation is trained. The generation of the lowest birthrates will leave school in 1990/91, whereas the generation of the highest birthrates will leave school in the early 1980s. The temporary reduction in the number of pupils in the 1980s must not obscure the fact that it will rise

again later, and the rise must be taken into account in planning facilities and personnel for the education sector.

The demographic boom will produce about 280,000 juveniles in universities, colleges and technical schools in 1991, the low birthrate period at least 180,000. When the proportion between the training of skilled workers and the education of students at technical schools and universities is determined it will, therefore, be imperative to pay attention to the requirements of reproduction of the social labour potential as well as to those of continuity and proportion in the educational system.

Problems of proportion in education and problems relating to the qualitative and quantitative reproduction of the social labour potential can be resolved only through long-term planning, with due consideration of the time factor.

D. Development problems of education and employment

The intensification processes in the national economy stemming from accelerated scientific and technological progress set new standards for the development and utilization of the social labour potential. The reproduction of the social labour potential in the GDR will, on the basis of these standards, be characterized mainly by the following elements (see Schaefer and Wahse, 1980, p.430 et seq.):

- efficient utilization of the labour and qualification potentials with a view to releasing labour,
- the continuous and long-term guarantee of simple and expanded reproduction of the population of working age,
- the guarantee of the necessary levels of qualification and occupation, predominantly by raising the qualification level in the various spheres,
- further definition of the content of work by technological and organizational measures as well as by increased transition to the production of qualification-intensive and science-intensive products.

1. Qualification and occupation structures

Another problem consists in tapping, through an efficient educational structure, potentials for the development of labour which are conducive to personal development and increased performance. Efficient qualification and occupation structures imply an optimum ratio between education that is in line with requirements, and employment, which corresponds to particular qualifications, in jobs for which training has been provided.

This includes, inter alia, the tasks:

- establishing and maintaining well-balanced proportions between jobs and qualification levels in the labour force;
- ensuring an optimum ratio between the numbers and structures of the labour force and the jobs;
- making demands on work that promote personality development as well as performance;
- ensuring the necessary flexibility and mobility in the labour force.

The planning of efficient qualification and occupation structures is a complex task, to be accomplished in a framework of economic planning within the educational system. At present, it is more and more necessary in the GDR to engage in planning the qualification and occupation structures in close connection with the classification of work, to further develop tried and tested forms and methods of planning the structures and, what matters most, to apply them consistently.

A well-balanced age-structure facilitates the reproduction of the labour potential. In the various enterprises, occupations, and branches of the economy it is still widely differentiated and depends on (1) the average duration of employment in an enterprise, (2) the distribution of sexes, (3) the number and structure of jobs and, (4) last but not least, the efficiency of continuing education.

It is necessary to achieve a better balance between the sexes. This is still complicated in practice because a number of jobs still demand physical strength and involve special working conditions which encourage the selection of young men as trainees. Some enterprises, in organizing their work, have undertaken job analyses which have helped to make jobs available to women in spheres and occupations which were previously not available to them, and these companies have better-balanced structures. The training of young women in technological occupations is encouraged wherever working and living conditions are designed in accordance with our socio-political programme.

Regional balances are also increasing in importance. The labour structure of a region results from its economic and residential structure, and is influenced by such factors as economic geography and demograpny. Those occupations in the various sectors, branches and enterprises which reflect the economic character of a region have the greatest share in the occupation structure. More specific division of labour leads to the emergence of new spheres of priority in the economic development of a region, which in turn make new demands on the training structures.

Labour demands are also increased when companies are established in regions where their industries have not existed

before. Resources are often qualitatively and quantitatively insufficient, and manpower requirements must be filled on a long-term basis by efforts on the part of vocational education, but on short-term bases by making use of the substitution potential, and the mobility and flexibility of the labour force in the region.

Quite different are the pressures on the qualification and occupation structures in congested industrial areas. The relatively broad supply of jobs results in more frequent manpower movements than in regions of more limited job availability. These manpower movements often interfere with the efficient planning of the occupation structure.

The further development of the qualification structure of the social labour potential is determined by the distribution of the students who have just finished their vocational education. Future educational planning must be based on research into economic aspects of education if this distribution is to be appropriate to the demands of industry and society.

The concrete requirements of society (the qualifications structure) must be met by the advance determination of the proportions in vocational education-vertically by determining the qualification levels of skilled workers, technical-school and university or college graduates, and horizontally by proportioning occupations and fields of specialization.

New problems emerge from the fact that the mid-1970s were marked by a qualitative change in the relationship between requirements and the existing (and increasing) supply of qualified specialists. The great achievements of socialist society in developing the education and qualification of young people and of all working people resulted in overcoming the deficit of qualifications which had lasted for decades. The employment conditions of the majority of those who have finished their education and started working have, of necessity, changed over the past few years.

Many workers today discharge functions which they could rarely have discharged previously. This applies to all levels, from skilled workers to university or college graduates. Changes in the conditions of employment, which have been brought about by a successful educational policy, raise a great many problems, however. A certain loss of attraction is noted in many training courses which were previously much in demand(1). Many jobs requiring high levels of qualification are still hard to fill.

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(1) Problems of training at universities, colleges and technical schools have been studied by Wolter (1977).

There are other, new problems in this connection which are linked with expected long-term changes in the structure of the national economy; these problems relate to the utilization of the available educational potential as well as to new demands on its development. Scientific and technological progress elicits new combinations of science, technology and qualification in human labour. Structural changes in the national economy make new demands on the flexibility of the producers, on their ability and preparedness to adapt. Last but not least, this implies the consistent development of the polytechnic character of the comprehensive school, the furtherdevelopment of relations between general and vocational education and its integration into the process of lifelong learning, and the orientation of education and its goals toward the fulfilment of the demands of scientific and technological progress, which must be resolved on a long-term basis.

2. Qualification requirement trends

The aforementioned present and future contradictions between the qualification potential (as opposed to 'education' in the general sense) and its full utilization may be stated as the contradiction between the dynamics of development of education and qualification and those of development of objective requirement structures. These, in turn, decisively depend upon the stage of development of the productive forces and the social division of labour. While the levels of education and qualification in general show a continuous upward trend, the objective requirements, particularly with respect to qualification, develop in a highly discontinuous and contradictory manner. Major trends towards raising these requirements are accompanied by-or even associated with-trends toward further simplification of work functions. But according to some research results, there is a definite trend toward greater qualification requirements (see Schaefer and Wahse, 1980, p.430 et seq.), mainly due to progress in:

- integrating work functions, job enrichment, and improved co-ordination of activities within the work-teams;
- combining the activities of preparing and executing production, as well as those of working and decision-making;
- eliminating mental and physical stress associated with simple and repetitive machine work;
- supervisory and maintenance functions;
- motivation and attitude of workers due to better equipment and working conditions, variation in working activities, and quantification of results.

A recent trend indicates a growing need for labour versatility. Opportunities for changing jobs and flexibility in functions make greater demands on workers, who thus need wider qualifications. Versatility enables a worker to adjust quickly and smoothly to technical and organizational changes in the production process, and it is acquired through general, technical, technological and economic training and experience, the most important feature of which is that it be lifelong.

Versatility is an expression of skills such as

- the understanding of processes and functional relationships in production and its elements (the ability to think in logical, functional, technical, constructive, and economical terms);
- the use of acquired knolwedge not as evidence of past education but as a basis for lifelong learning (abilities involving self-reliance and creativity, the application of methods of learning and intellectual work, and the utilization of adequate instruments and means).

These qualification-raising effects of scientific and technological progress on the requirement level with respect to the qualitative reproduction of the labour potential will certainly acquire growing significance during the years to come. But the contradictions between the levels of education and qualification, the need for interesting work, and an adequate scientific and technical standard for equipment are obvious, and can be reconciled only in the long run and on the basis of conscious and systematic social action.

It is possible not only to recognize the effects of scientific and technological progress, but also to influence them. In a socialist society, it is possible to counteract those effects of technical progress which are not in line with the intended development of society and of the working experience. Technical progress is certainly not the sole factor of change in qualification requirements. If the development of qualification depended solely upon the technical and economic requirements of the subjects and means of labour, fashions in qualification would inevitably develop. Such trends can and must be counteracted in the interest of society and of each and every individual. It is one of society's main tasks to reorganize jobs in such a way that existing qualifications be used optimally and that scientific and technical progress cause the requirements to increase rather than decrease. This goal implies continuous re-evaluation of the techniques used, of the division of labour, and of the organization of specific jobs.

This process, however, should go beyond the limits of the individual workplace. What matters is the increasing

involvement of workers in planning and decision-making, and in their own activities, to improve the efficiency of the production process and working conditions. The percentage of innovators(1) in industry rose from 15.5 per cent of those gainfully employed in 1970 to 32.0 per cent in 1979. Representative studies showed that there is a close positive correlation between the level of qualification and the number of draft innovations submitted(2). Economic development is more and more conducive to the development of a personality, and in turn to production-advancing qualities and improvement in the character of work.

Obviously, we must seek to avert the danger of routine work, monotony and lack of creativity, to counteract trends toward simplification of work within a qualification, and to take social considerations into account in a way that satisfies all those concerned. In economical and scientific research such considerations focus on four main tasks:

(a) overcoming the one-sided adjustment of human labour to technical and technological processes at every step;
(b) enlarging and enriching jobs requiring low levels of qualification which are often monotonous and routine, usually through combination;
(c) preparing all working people to assume more responsibility and involving them comprehensively in the planning and decision-making of production processes;
(d) planned job rotation which, however, presupposes a level of versatility in workers that must be acquired either through vocational training or continuing education (see Schaefer and Wahse, 1980).

3. Efficient use of the labour potential

Scientific and technological progress increasingly causes shifts and changes between human and mechanized labour and also within human labour. On the one hand, there is a quantitative decrease in human as opposed to mechanized labour; on the other, the quality function of human labour within the working process is increasingly gaining in significance. Changes in accent on the individual components also occur within the

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(1) Employees who submit suggestions which are applied and successful.

(2) Studies of this subject are undertaken at the Central Institute of Economic Sciences of the Academy of Sciences of the GDR. See Schaefer and Wahse, 1980.

human labour sector. Qualitative factors in the labour potential, such as standard of education, qualification, versatility, efficient employment and advanced professional training are highlighted. The quantitative factors of the labour potential are increasingly reaching their limits, within which, however, there are still substantial reserves to be tapped. These include full utilization of working hours and, above all, the development of productivity- and efficiency-promoting employment structures.

The utilization and raising of the qualification level of the social labour potential, the establishment of efficient qualification and occupation structures, and the absolute saving of manpower become important criteria in the reproduction of the labour potential as the transition to intensively expanded reproduction takes place in the national economy of the GDR (see Heinrichs, 1979, p.395 et seq.).

Releasing workers for new jobs is more than just a quantitative cut-back. It raises the question of how to employ released personnel. The releasing of labour should be paralleled by a gradual elimination of physically heavy, monotonous and unattractive jobs, so that it becomes a factor in improving the overall quality of jobs. Another major problem is the release of labour for which there is a particularly high demand within the national economy. The absolute saving of labour also assumes increasing significance as population and employment develop in the GDR (see section on demographic processes above, pp. 25-32).

The social labour potential is also limited by legally fixed working hours. Far-reaching social welfare measures introduced since the foundation of the GDR, and particularly in recent years, have significantly reduced working hours. Today, each employee works an average of 33 fewer working days than in 1960, which is the equivalent of around one million full-time workers' annual work. Moreover, the 10-year compulsory educational reform limited the potential growth of the available labour potential of the GDR to some 400,000. The increased numbers of full-time technical school, college and university students have had similar effects(1). In the long run the effects of these measures will be positive, but they have temporarily reduced the labour potential of the country.

Turnover, that is the unplanned movement of labour, is a primary obstacle to the efficient utilization of the labour potential. It is usually personally motivated, and often has

(1) Calculations made by R. Schaefer and J. Wahse, Central Institute of Economic Sciences, Academy of Sciences of the GDR.

negative economic and social implications. Investigations have shown that workers whose vocational training has equipped them with a high degree of versatility are more likely to change jobs than those with branch-specific training, and that seniority and age tend to deter workers from changing. Considerable economic reserves will have to be tapped to adapt the social labour potential to social needs, and particularly to develop qualification and occupation structures which are compatible and make spontaneous labour turnover unnecessary.

In the sixties and 1970s the primary aim was to raise the level of the qualification structure, and this effort will of course be pursued. But it will become more and more important to raise qualification levels within the qualification structure, and if the quality of the social labour potential is to be raised, we must consider such factors as motivation, interests, and changes in the needs of a given working process. This improvement will be brought about through the rational translation of existing potentials into real performance, and releasing workers for other, more efficient jobs; there are obviously problems to be solved and further scientific investigation to be conducted, long-term strategies to be elaborated, and conditions evolved which are conducive to their solution.

The efficient utilization of the highly qualified potential established requires, above all, material and technical conditions of production that correspond to the qualifications of the labour potential, and consistently scientific organization of work. The present economic strategy emphasizes the following tasks, deemed essential to the translation of the labour potential into real performance:

- distribution of manually and academically trained manpower throughout all spheres of the economy according to the needs of the national economy, with a view to releasing manpower for other tasks;
- to create, on the basis of changed structures of production, prerequisites to increasingly produce use-values requiring a high level of qualification;
- to organize the employment of manually and academically trained manpower at the level of qualifications reached, in jobs where the qualifications acquired can actually be used;
- to guarantee the socially necessary mobility of the labour potential, and develop economic mechanisms in such a way that versatility and socially necessary releasing processes can be better controlled by planning;
- to reduce turnover to a socially reasonable level so as to minimize losses in working time, productivity and education;
- to achieve optimum utilization of working hours and socially appropriate labour intensity;

- to improve working conditions and augment material and moral incentives.

These key strategic issues in the reproduction of the labour potential in the 1980s will also gain in significance as essential components in further planning well-balanced relations between education and employment in our social and economic development.

II. Relationship between training, further education and employment

A. General education to prepare for working life

Scientific and technological progress enhances the role of formal general education in preparing for life and a career. Experience and scientific studies undertaken in the GDR show also that traits such as awareness, creativity, versatility, interest in science and technology and the ability to do scientific work, which are in turn important to scientific and technological progess, substantially depend upon the standard of general education. In the GDR, general education at comprehensive schools has a scientific natural sciences and polytechnic character, since these subjects are universally in demand at all levels and in all spheres of school life, (including the social and natural sciences). And provides a technical understanding of the foundations of production.

The work of pupils in the production sector is an essential component of this concept of general education, which unites polytechnical knowledge, skills and abilities as its starting-point in vocational training, and creates favourable preconditions for a new quality of specialized education. The general polytechnic school enhances the students' understanding of science, arouses their interest in technology and production, and induces in them a creative attitude towards work. Preparing young people for their working lives presumes, above all, making ever more effective use of these advantages; and the complementarity of productive labour with instruction and gymnastics, education with social practice, should be the concern not of educators and schools alone, but of society as a whole. Great importance is attached to setting up links between schools and enterprises, and the enterprises effectively support the general schools' programmes. They offer varied and interesting leisure-time activities, and it is

a tried and tested method to hold polytechnical classes for pupils of the 7th to 10th years directly in a production plant. At present some 5,000 enterprises offer polytechnical instruction to about one million pupils. More than 3,000 polytechnic institutions, special-subject classrooms and workshops have been established by enterprises. Skilled workers, supervisors and engineers,-6,000 on a full-time basis and 30,000 on a part-time basis-guide the productive work of the students. Today, many managers consider instruction as much their responsibility as their professional commitments.

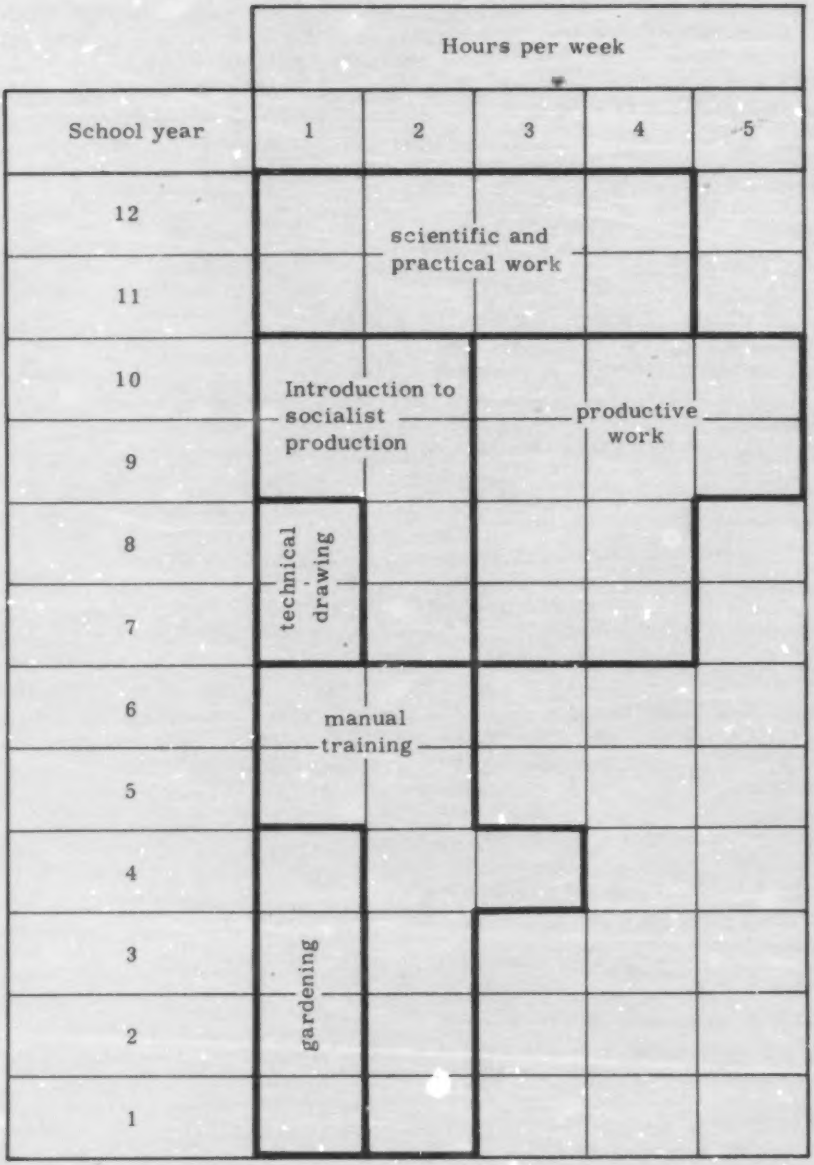
In the GDR, the term 'polytechnic' applies to the following subjects (see Fig. 6):

- gardening; one lesson per week for 1st to 4th year pupils in the school garden;
- manual training; one or two lessons per week for 1st to 6th year pupils in school workshops;
- technical drawing and introduction to socialist production; two lessons per week for 7th to 10th year students;
- productive work, 7th to 10th year; two or three lessons per week, held in polytechnic institutes, special-subject classrooms or workshops attached to companies or their departments;
- scientific and practical work; four lessons per week for 11th and 12th year (secondary) students in firms.

Organization of productive work for the pupils of the 7th and 8th along uniform lines has proved its worth, whereas productive work in the 9th and 10th years is organized around differentiated skeleton programmes which are applied according to local conditions. Skeleton programmes have been drawn up for the metal-working industry, electrical engineering, the building industry, agriculture, maintenance of agricultural equipment, the chemical industry, the textiles industry, the clothing industry, and the wood- and leather-working industries. This range of skeleton programmes is supplemented by a range of optional programmes such as automotive engineering, radio engineering, technical repair, cooking-serving-caring, environmental protection, etc. These programmes are carried out by special-interest groups, and pupils may choose according to their interests.

The skeleton programmes envisage providing the pupils with basic working knowledge, skills and abilities for the manual and mechanical processing of the most common materials, for assembling, dismantling, repairing, and operating machine tools and other machinery, and technical equipment in any industry. The pupils acquire elementary knowledge and skills in planning and preparing operations, in measuring and testing,

Figure 6 - Polytechnic instruction in 1st to 12th years



labour safety and health protection. They learn to apply knowledge gained in mathematics and the natural sciences to the accomplishment of productive tasks. They also acquire basic knowledge in the fields of process-planning, machine theory, electrical engineering and electronics, economics and job organization, as well as basic skills in the preparation and handling of technical drawings. Thus the pupils acquire working knowledge and skills that are required in about 80 per cent of the occupations in the national economy.

The orientation of education toward productive work, to acquire the basic working knowledge, skills and habits which, in turn, form a broad basis for subsequent vocational training and a sound preparation for life and work, has been implemented in a systematic manner. The pupils' productive work, their involvement in controlling the production process at factory level, their integration into actual work teams, consistently prove to comprise a personality- and performance-promoting social sphere for up-to-date job-preparing education in basic subjects, and offer the essential preconditions for the development of motivation and interest in science and technology, on which they can base a realistic vocational orientation.

While the general polytechnic school is not designed to impart specialized vocational education, it can and should lay the groundwork for the working life of the young generation. To a certain degree, depending upon the enterprise where the pupils do their productive work and the skeleton programme underlying their instruction, the pupils also acquire some specialized knowledge and skills.

At the comprehensive school, productive work has a decisive social influence on the young people. Close co-operation between the school and the enterprise has made it possible to use work in its most socially advanced form for the effective education and upbringing of pupils. They combine intellectual with physical work in modern manufacturing enterprises, are directly involved in tasks at enterprise level or on manufacturing teams, in the complexity of learning and working in a producing company-at school and during leisure time. New conditions of educational organization are evolved in all subjects, and multifaceted learning gauged to the interests of the pupils. Specialist teachers at comprehensive schools may rely on advanced awareness in the pupils. Activities in the most varied special-interest groups, along with socially useful and productive work, creates situations in which they can apply what has been learned, and conversely, their practical experience contributes to the validity of instruction.

The system of special-subject instruction must solve other problems encountered in the pupils' preparation for working life. Special subjects in the fields of mathematics and the natural and social sciences, and corresponding optional study groups, help to provide pupils with such elementary knowledge and skills as are necessary for success in vocational training, and effectiveness in working life.

In short, the preparation of the young generation in a general polytechnical comprehensive school aims at:

- consistently implementing the polytechnical principle during instruction in all special subjects;
- closely linking polytechnical instruction in a grade-adjusted way to productive work;
- gearing the scientific and technological extramural activities and socially useful work done by school students during instruction and in their leisure time to an active involvement in the solution of problems posed by scientific and technological progress;
- ensuring the close co-operation of school and enterprise and an immediate exertion of influence by the working class on the education of school-age youth;
- including all social forces in the preparation of the pupils for their working lives and their vocational orientation.

In future, we must widen the range of opportunities for pupils to participate in the enterprises' science and technology plans, and opportunities for intensifying the interaction between learning and working should be sought. In the spheres of natural sciences and mathematics, the methodological organization of instruction must be revised. The social sciences must provide pupils with a deeper understanding of the interactions between (a) scientific and technological progress and (b) the development of the economy and social working and living conditions. It is in these directions that development of the polytechnic character of formal general education must be pursued.

B. Career and study guidance

In the GDR career and study counselling is part and parcel of its educational, youth and recruitment policies, and of the educational complex dealing with the systematic preparation of the young generation for work and life. This is a social process, mainly organized along educational lines, intended to make it easier for school leavers-but also for adults-to choose suitable occupations and to prepare for them through suitable vocational, technical-school or university training (see GDR, 1970, 1975b, 1977 and 1980b). Enterprises,

educational institutions and career-guidance centres are involved in this process on a long-term basis. Its aim is to harmonize personal interests, social requirements and manpower needs in the best possible way.

1. The concept of educational orientation

Career and study guidance follows an educational concept as opposed to a psychological (psychotechnical, psychodiagnostic) one. A salient feature of socialist society is the direct correlation between social and personal concerns which is brought about by educational means at the point of choosing a career. The educationally-oriented concept of career and study guidance bears a direct connection to educational guidance with respect to its contents and institutions, and it is subordinate to the latter.

The social character of career and study guidance represents the first basic feature of this concept. The educationally-oriented concept corresponds to the "open" career guidance system. Schools, enterprises and other institutions and organizations responsible for development and guidance share the responsibility for this task with a special career-and study-guidance service. Hence, career and study guidance becomes an affair of public interest.

In the GDR career and study guidance is guaranteed by the state, which is also responsible for co-ordinating the various career-guidance policies on the local level through the local popular representative bodies and their authorities, particularly the departments of vocational education and career guidance attached to the county and district assemblies. Our experience shows that one single institution is unable to ensure a standard of career guidance that corresponds to the social needs.

A second basic feature of the educationally oriented concept of career and study guidance is the establishment of equal vocational opportunities for all young people. Career and study guidance makes its contribution towards employing the potentials of the integrated socialist education system for the vocational development of all children. It has become a matter of principle to encourage all pupils towards an optimum utilization of their individual potentials, and to help them to embark on one of the different paths toward learning a vocation. There is thus no institutional separation of career and study guidance. The necessary differentiation in guidance is always ensured within the integrated process.

Guaranteeing equal opportunities for everybody also implies taking account of the various interests, inclinations and capabilities of the young people concerned. The dialectics

of standardization and differentiation is of significance for the conceptual and methodological organization of career and study guidance. Applicants are admitted after consideration of their interests, aptitudes, and levels of performance, and according to social needs.

A third basic feature of the educationally oriented concept is the process of choosing a career. For the time being, however, the theoretical foundations for this concept are still in their infancy. To seek out the laws governing the choice of a career it is necessary to carry out far-reaching empirical, mainly ideological, investigations. These have not yet been completed, but the following conclusions can be considered sufficiently reliable:

- the choice of a career is the result of a prolonged psychological process of watching, understanding, and evaluating, and of developing and specifying vocational anticipations;
- the choice of a career is subject to objective social and economic conditions and needs; it can, however, be controlled through educational means;
- taking into account social needs, the choice of a career must follow individual needs and interests in the best possible way.

The primary objective of investigations of choice-of-career behaviour turns out to be the study of vocational trends among young people and of motivations governing their choices, particularly that of vocational self-determination. It must not be overlooked that the attitude of a young person towards a possible or suggested career has a fundamental bearing on his or her success and satisfaction in the career.

Sociological studies underline the basic significance which is to be attached to early and comprehensive career and study guidance (see Meier, 1974, p.29 et seq.). W. Kuhrt and K. Siebel (1976, p.67) state, in this connection, "The process of finding an occupation (choosing a career) is an active process in the personality development of young people ... The choice of vocation always involves becoming aware of and setting oneself a target which in turn becomes very effective for the work and self-education of young people. They are less biased in their choice of career if they are better informed about the economic prospects of society, its need for junior staff, and the requirements of a vocation, and more aware of their own capabilities".

A fourth feature of the 'educationally-oriented' concept is the long-term character of career and study guidance. Experts in both theory and practice stress the need to start systematic career guidance, if possible, at the lower level of the comprehensive school. Scientific and technological

progress supports advanced vocational training and encourages trends towards multiple qualifications and the acquisition of second qualifications. Thus career and advanced training guidance in conjunction with the working and learning process is gaining in acceptance, and the 'educationally oriented' concept of career guidance will have to make more concessions to the principle of "lifelong learning" than it has in the past.

Exactly because a free choice of career presupposes a profound understanding of social development factors, and of oneself, this process enjoys the enduring support of government institutions, enterprises and groups, and of general and vocational institutions of education and higher learning.

The 10th Congress of the Socialist Unity Party of Germany said in this connection: "Young people are well prepared for their future careers and work at our ten-year polytechnic schools. Choice of career is the first big decision in the life of a young person. We have made good progress in helping girls and boys to make their decision in such a way that the requirements of society correspond as far as possible with individual interests, inclinations and abilities. This also applies to the choice of study courses at university and college, a decision that now coincides with the career choices of all pupils. We should draw on our positive experiences in order to organize even more efficiently the entire system of career guidance for the benefit of pupils and their parents in close cooperation with the schools, including the mass media programmes, publicity campaigns, and information by enterprises, universities, and colleges, and career guidance centres" (see Socialist Unity Party of Germany, 1981, p.132).

2. Aims and criteria

All government decisions and regulations on career guidance stipulate that the best possible correlation between personal interests and social requirements be established. An essential aspect of this objective is that under the given social conditions there be a general correlation between the social and the personal at the grassroots level, as well, and this correlation must be established in every case.

Investigations of the career plans made by young people and the actual behaviour of young skilled workers and university and college graduates, however, show that the vocation young people want and the one they actually learn do not always coincide, and preference may not always be a valid criterion on which to base guidance. One aim of career and study guidance should therefore be to prepare the up-and-coming generation for choosing a career from as wide a field of data as possible, and in full awareness of the consequences of their

decision, which should include job attachment, the will to succeed, and harmonious personal adjustment.

Empirical evidence indicates that signing a deed of apprenticeship in a junior staff scheme, applying for a course of study at a technical school or university, or choosing a career on the basis of social influences, cannot constitute the sole basis for guidance. A positive and realistic attitude toward one's occupation, enterprise, course of study, etc., which manifests itself in the will and ability to succeed, may be a more valid criterion.

Experience and scientific analyses both indicate that career and study guidance should elicit an awareness of the interrelations between the social, sectoral, regional and enterprise-related aims and objectives. Three complexes of aims may be proposed:

(i) Personal considerations

- providing the developing personality with a general motivation for work and life, supporting self-realization through the development of prospects;
- stimulating the young person with respect for learning, working and spending leisure time meaningfully;
- encouraging proper attitudes, motives and value judgements.

(ii) Socio-political considerations

- applying educational, youth and employment policies aimed at the systematic development of a social
- structure that is suited to an advanced socialist society;
- implementing economic and social policies by creating a balanced male-female employment ratio and equal levels of qualifications in the various spheres of society;
- promoting job equality for women as a major precondition for their full equality in social life, marriage and family;
- politically and socially integrating the young generation into society and its elemental units, systematically developing job prospects for young people in a differentiated and gradual manner;
- putting into practice the tenet that all children must have, within the limits of their intellectual and physical abilities, equal career opportunities.

(iii) Utilization of the social labour potential:

- reproducing the social labour potential by vocation, qualification, age and sex in all spheres of society in a planned and balanced manner;
- developing a job and enterprise attachment, encouraging positive attitudes in young people toward occupational mobility as a precondition for achievement and toward job assignments in line with social needs;
- efficiently utilizing the individual capabilities of the future skilled workers, technical school and university graduates as a result of their choice of the right career;
- developing and utilizing all abilities and talents to lay the groundwork for creative break-through in the fields selected.

3. Functions

In the GDR, career and study guidance has the following functions:

- information and explanation
- orientation
- education
- diagnosis
- advice
- appointments

The information function implies both education and orientation, and provides the general and specific information necessary for an appropriate choice of career. This general information includes information about social, and particularly economic, aspects of the choice, about all the vocational and educational paths available, and about the occupational requirements and administrative problems involved, as well as social assistance offered to overcome them.

Specific information includes social and economic information with respect to the various vocations and occupational groups, the educational paths leading to them, the specific requirements of a vocation and steps taken by career guidance officers, if applicants come upon difficulties.

The orientation function gives the young person a vocational direction that corresponds with both the actual social needs and their individual abilities. Experience shows that vocational inclinations usually accompany the intent to learn a particular vocation, and find their expression in plans made by young people with respect to their future working lives. Giving the proper attention to the individual wishes of young people and clearly explaining the objective needs to them

has proved to be effective in guiding their plans along individually and socially feasible lines.

The educational function includes the following:

- development of a positive attitude towards and acceptance of social needs in choosing a career, and toward the personal consequences thereof;
- development of a constructive and realistic attitude towards vocations and their requirements;
- development of work- and society-related motivations and value systems, and overcoming utilitarian motives;
- stimulation of learning, study and work behaviour;
- development of readiness of the applicants for an apprenticeship or course of study to realistically assess their own capabilities.

The educational function of career and study guidance has not been linked to any forms or methods, and no purely recruiting practices are applied.

The diagnostic function is a feature supporting and accompanying the choice-of-career process. It is usually applied in the following ways:

- fitness assessment by school or enterprise physicians;
- educational and psychological assessment-given the methods applied, this is mainly a personality assessment both with and without a general view to the career chosen-by teachers, lecturers or career advisers;
- self-assessment by the pupils themselves, in particular, to determine their vocational orientation and level of information;
- assessment of fitness for jobs with high physical and mental demands by specialized psychologists and physicians.

The advisory function means influencing the young person's choice. Advice, in the sense of assisting every young person in this field as effectively as possible, may take place in an indirect or direct way.

In the former case, the advisory effect is brought about by educational and other means. There is, however, no feedback or response. The advisory function may be implemented by means of lectures, excursions, participation in special-interest and study groups, publications and/or the mass media.

In the latter case, advice is given in a personal, direct and individualized way, and includes discussions of problems and strategies for selecting a suitable vocation.

The appointing function is a special function designed to support the process of finding a suitable vocation for certain groups of the population. The biggest of these groups is usually that of the physically and mentally disabled. These persons are also prepared, on a long-term basis, for choosing a

career, or at least a suitable occupation. They cannot always make this decision for themselves or, when they do so, an unreasonable risk may be involved. This is where the appointing function is needed, as well as practical help in learning a particular vocation and integrating into the working process.

4. Career guidance centres

The 1970s witnessed the establishment of career guidance centres as educational institutions. Today, a network of 217 career guidance centres covers all the regions of the country. Every year more than half a million pupils and their parents seek and get individual advice there. Career guidance centres employ educators, psychologists, sociologists and physicians on a consultative basis.

Large enterprises disseminate through career guidance centres information about selected vocations in which training is offered. Co-operating with other social forces, the career guidance centres serve enterprises, general schools, institutions of vocational training, technical schools, colleges, universities, social organizations, economic departments and government agencies in meeting their responsibilities. They stimulate the exchange of experience and evaluate the results of their initiatives. Career guidance centres have a direct say in compiling career and study guidance material. Above all, they must fulfil the following functions:

- career- and study-guidance of classes and groups of pupils;
- assistance of individuals in the choice of a career and advanced training and education;
- advanced training of career advisers to enable them to become more effective;
- dissemination of educational publicity;
- compilation of job-specific material and provision of methodological recommendations;
- assistance of government and economic agencies in their analytical and conceptual work in the field;
- efficiency studies.

5. General observations

As a rule, young people make their decisions as to which vocation to learn during the tenth year of the general polytechnic school. One year prior to the beginning of vocational training (unless the pupil has chosen another way to

continue his education) a deed of apprenticeship is signed. In 1980, some 80 per cent of all school leavers were admitted to training in their chosen vocation after their first application, an achievement which was largely due to an upswing in the quality of career guidance. Organizational steps such as beginning to record and collect data on the vocations pupils envisage as early as the 7th year have, no doubt, added to the efficiency of career guidance.

In the GDR, planners charged with ensuring the sufficiency of young skilled workers can rely on a relatively stable set of skills in the various trades, an essential precondition to providing realistic information to school leavers and their parents and arousing their interest in their prospects. Surveys of apprenticeships and study guides adapted to particular institutions of higher learning supplement the range of information available. These publications contain the information necessary for choosing a career.

Several years of analyzing the vocations pupils intended to train for enabled planners to compile "apprenticeship directories", which are regularly issued for the training year ahead, and which contain pertinent information for young people facing the prospect of choosing a career. As a rule, there are between 70 and 100 different skilled trades which young people may choose from in their local areas. The high quality of career guidance available results, in most cases, in a correlation between social needs and personal interests. Every young person may apply for an apprenticeship in an area apart from his or her local one as well. In fact, one in four trainees lives in a trainee's hostel, indicating that he or she is training outside the home area.

Unlike skilled training, which is marked by a relatively high percentage of local-area apprenticeships, higher learning makes great migration demands on young people, as analyses have shown, both for admission to an institution of higher learning and for entering working life after graduation. This obviously is an area of conflicting interests which cannot be reconciled by planning alone.

Right from the application phase, study orientation and guidance aims at bringing about a correspondence between the number and structure of admissions according to social needs on the one hand and personal interests, aptitudes, and inclinations on the other.

Information is provided on courses of study, prerequisites, and where to enrol; prospective applicants also receive information on the profession and work requirements and conditions. This process is supported by publications on study opportunities, course contents, and opportunities for postgraduate study.

The centralized and EDP-supported storage of preferred courses of study has proved to be of great help in the acquisition of such data, and has made it possible to determine and evaluate general and local trends at an early stage and turn them, by way of feedback, to good use in decentralized study orientation and guidance (see GDR, 1980c,p.79).

Scientific analyses and empirical observations indicate that in study orientation and guidance great emphasis should be placed on co-operation between the institutions preparing the pupils for university entrance, representatives from the field, and scientists from institutions of higher learning. The involvement of institutions of higher learning is encouraged by the fact that they form a ramified and theoretically locally balanced network. In practice, career and study guidance provided by leading universities and colleges at the Abitur level (university entrance qualification level) has proved its worth. The university or college, which, as a rule, represents the biggest and scientifically most advanced institution of its kind in a region, bears the major responsibility for informing the concerned institutions and the public.

If applications exceed admission capacities (determined as the socially justified number) aptitude interviews are held. Lecturers participate in these interviews, and parents may also be admitted, if they wish. Special abilities, inclinations and motivations of the applicants are considered, and may indicate a particular course of study. The interviewees are offered alternative study suggestions which for one reason or another have not occurred to them, but may correspond with their interests and inclinations. Such discussions are indispensable in harmonizing social with personal educational needs.

This is what the Minister for Higher and Technical Education of the GDR had to say: "As a result of the responsible co-operation of all those participating in the implementation of the integrated socialist educational system, we have been able to improve career and study orientation in recent years. During the past two years, the aims of the university and college admission schemes were fulfilled, for almost 90 per cent of all students' personal interests corresponded with social needs in such a way that it was possible to admit the applicants to the courses of study they first applied for" (see GDR, 1980d,p.65).

The admissions committees invite those applicants who, for personal or national economic reasons, cannot be admitted to the chosen course of study, for discussion, after which they make recommendations guiding the applicant toward other institutions which offer the same course of study and are not yet filled, or toward related courses of study. If the

applicant is not admitted, the reasons are explained to him. All parties involved will seek to clear up any problem which may arise, in the interest of the future development of the applicant. (1)

Admissions committees base their work on the constitutional principle according to which applicants are admitted "in accordance with the performance principle and social requirements, taking into consideration the social structure of the population" (GDR, 1975a, Article 26.1). Although the number of admissions granted for the courses of study chosen by the applicants in the first place is almost 90 per cent."... existing disproportions and the difficulties involved in establishing a correspondence between social needs and personal interests" (GDR, 1980d, p.65) are neither overlooked nor underestimated. While there are still too few applicants for important technical courses of study such as mechanical engineering and process engineering, courses such as medicine, stomatology, psychology or German studies receive a surfeit of applicants. It is, therefore, very important, "through early and specific career and study guidance, to avoid the disappointment which undoubtedly develops in both the rejected applicants and their families".

Granting admission to institutions of higher education contributes to attaining the targets of educational planning, which in turn forms part of the overall planning of the national economy. Each institution of higher education has an admissions scheme derived from these targets, and broken down by field of study. Study orientation and guidance follow the lines of the provisions contained in those schemes. The underlying objective is to draw the attention of young people to those institutions and vocations which are expected to be in line with the future needs of the national economy.

Practical assignments prior to taking up studies at a college, or university, which have gradually been introduced since 1976, have proved to be very useful in preparing school leavers for university studies. All applicants for technical, agricultural, economic and medical courses, as well as those

(1) Note: There are admissions committees at every institution of higher education. They consist of competent scientists from the respective fields, representatives of the socialist youth organization and the trade union all of whom cooperate on an equal basis. Practical specialists may be admitted on a consultative basis. The final decision is made by the vice-chancellor of the institution concerned, who, however, relies on the work of the admissions committee.

for the training of vocational teachers who have not had vocational training adequate to the chosen course of study are thereby able to acquire the relevant vocational knowledge and practical experience. By working for six months to a year in an enterprise or an institution related to the chosen course of study, those applicants without vocational training gain an insight into their future working environments. Studies have shown that the idea school leavers have of their future profession, as well as their expectations, are adjusted by this practical experience and become more realistic. In general, we can add that practical assignments prior to study exert a positive influence on study motivation, lay the groundwork for improving the quality of training, and contribute, to a certain degree, to the development of professional ethics.

6. Methodology

Since career and study guidance is, as far as its content is concerned, an educational process, a great deal of importance is attached to its methodology. With regard to the methodology of the counselling process the following observations have been made.

(a) Long-term and systematic organization of the guidance activity

It proved useful to start career and study guidance as early as possible, and to develop the vocational orientation of young people in such a way that by the time the decision is due, they choose a vocation in full awareness of all the factors involved.

On the other hand, scientific analyses clearly indicate that early career and study guidance alone is no guarantee of efficiency, which requires systematic and continued career and study guidance. Starting at the 6th year, the groundwork for a considered choice of career is laid, and adapted to the development of the pupils at each subsequent grade. At present, investigations are under way to determine the minimum of fundamental knowledge necessary for pupils to make the choice knowledgeably, and how the learning process should be organized at the middle and upper levels.

(b) Standardization and differentiation in approach

Resting on common aims, contents and conditions, the approach must be adapted to each case. On the other hand, all

young people must be provided with the same basis for a conscious choice of career, and a made-to-measure approach is necessary only in an exemplary sense.

Differentiated career- and study-guidance methods such as desriptions of vocations, and vocational orientation in the classroom, lectures for pupils and parents, discussions with experienced professionals from "the shopfloor" or educational films on career choice have proved to be very effective.

(c) Educationally effective methods

Those methods involved:

- persuasive, realistic, scientifically supported arguments based on solid practical experience that will develop the proper understanding of and attitude towards the social norms of the career;
- systematic utilization of good examples of career behaviour to promote successful work in the future;
- taking into account personal experience and external influences;
- exerting an influence on those young people who have made unrealistic career choices;
- systematically encouraging young people to take part in the solution of problems connected with their choice of career.

(d) Concrete, realistic, enthusiastic guidance

It has been our experience that all forms and methods of career and study guidance benefit from concrete information, realistic explanations, enthusiasm for the profession and the task, and correlation of theory with practice. A student's idea of a vocation may be made more concrete and realistic, of course, through practical experience in the job or in one that is very closely related to it.

(e) Active and independent student participation

Analyses have shown that the degree to which a young person is involved in the process of finding him- or herself a vocation has significant bearing on how choice-of-career problems are solved. Behaviour varies from passiveness to very active participation. The passive attitude, which is still found in a minority of young people, is most often the result of their immediate social environment, an information deficit, lack of experience or insufficient career guidance. But the student will become actively involved when subjected to the

proper social influences, and information and orientation which make it possible to act independently. The mass-media can be used to disseminate rational, well-conceived views of career and orientation opportunities.

There are clear differences in the choice-of-career behaviour between school-leavers who enter vocational training straightaway and those who enter a different kind of post-school education which may be combined with vocational training.

C. Aims and content of vocational-training programmes

1. Skilled training

Since the introduction of compulsory education at the comprehensive school, the percentage of school-leavers who start vocational training after finishing the 10th year has increased every year. By 1980 it was more than 85 per cent. This means in practical terms, that in the GDR 12-year education is virtually compulsory for all. Through the generalization of the right to vocational education, the source of unskilled workers has run dry. Young people who for one reason or another have to leave the comprehensive school early are still partially prepared for their working lives by vocational training which they have received in the lower grades.

(a) Educational Standards

More than 60 per cent of all gainfully employed people have completed skilled training since the foundation of the GDR. While in 1950 a mere 55 per cent of all school leavers learned a skilled trade, since 1970 all of those who have completed the comprehensive school have attended an institution of post-school education.

During the past thirty years the proportion of skilled workers in the total workforce has continuously risen (see Table 17).

In the GDR, almost all workers under 40 years of age have completed the 10th year of the comprehensive school, and had vocational training(1).

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(1) The Joint decision of the Politbureau of the Central Committee (see Socialist Unity Party of Germany, 1976), (footnote contd. on next page)

In 1980 three out of every four workers in the GDR had completed vocational training. One in six skilled workers was certified in two or more trades; 34 per cent of all gainfully employed college or university graduates, almost 73 per cent of all technical- and engineering-school graduates, and 100 per cent of all foremen have learned a skilled trade. In 1980, half of all the skilled workers had had advanced vocational training, and at the time of writing 22 per cent of the skilled workers represented by the annual growth acquire a higher level of qualification.

(b) Skilled trades

In the GDR there are 318 vocations for which training is offered, according to the "Directory of skilled trades" of 1 September 1980; 225 of these are for school-leavers who have completed the 10th year (these include 38 uncommon trades) 66 for those who leave school before completion of the 10th year, and 27 can be learned only in adult education programmes. During the past decade, the total number of skilled trades has remained relatively constant, and there are no major changes to be expected throughout the eighties. The national economy thus disposes of a sufficiently wide range of skilled trades, and we have been able to keep them stable in number and content since they were conceived so as to give the trainees a sound basic knowledge and possibilities for further job-related specialization. The system produces versatile skilled workers of a high level of general and vocational education, who are able to meet new demands made by their jobs, sometimes through short-term advanced training.

Curricula for the vocational training of apprentices are set by specialized government commissions composed of 12,000 experienced skilled workers, economists, scientists, specialists in the field of industrial medicine, and educators. The demands of science and technology elicited the gradual and differentiated introduction of basic subjects into vocational-training programmes.

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(1)(contd. from previous page)
the Council of Ministers of the GDR, the National Executive of the Confederation of Free German Trade Unions and the Central Council of the Free German Youth of 7 December 1976 "For a high standard of vocational training in the implementation of the decisions adopted by the 9th Party Congress" was of great importance in this connection.

Table 17 - Skill examinations taken by workers (apprentices and Abitur-level excluded), by selected trades, 1971-1978, in absolute numbers

Vocation	1971	1972	1973	1974	1975	1976	1977	1978	Index 1972:1978
All vocations	200 860	212 694	216 152	233 309	238 572	243 793	236 697	246 284	116
Control engineering	1 088	1 065	1 484	1 864	1 928	2 105	1 900	2 086	196
Data processing(1)	3 266	4 633	4 783	3 833	1 688	1 204	882	1 296	28
Electrical assembly	5 425	5 311	5 614	6 416	6 525	7 140	7 652	7 965	150
Manufacture instruments		192	1 105	2 151	2 136	2 280	2 241	2 194	1 143
Machine and plant assembly		1 891	4 283	5 213	4 738	5 192	5 305	6 004	318
Machine building		1 502	672	595	1 054	1 258	1 529	1 513	101
Metal-cutting	3 261	5 289	5 268	5 706	9 422	6 630	6 154	6 784	128
Turning		1 160	1 241	1 003	1 185	1 075	1 038	1 086	94
Repairs		2 116	4 438	5 653	6 082	6 649	6 876	8 045	380
Fitting	3 837	3 107	1 356	1 185	1 042	828	2 287	2 592	83
Machine operating		342	514	895	1 175	1 187	1 809	1 983	580
Vehicle fitting	3 763	6 113	3 389	2 147	1 839	1 109	7 346	9 697	159
Skilled construction	3 184	5 673	5 715	6 370	6 027	5 777	7 684	8 541	151
Brick-laying	6 281	6 354	6 024	4 522	4 141	4 000	4 791	4 486	71
Concrete-laying	1 033	987	1 029	1 007	752	635	749	719	73
Handling and storing goods		169	378	565	952	776	535	637	377
Commercial clerking		11 523	6 928	4 509	4 021	3 991	11 400	11 280	98
Welding engineering		374	537	490	562	568	518	607	162

Source: GDR, 1981b.

(1) The number of workers trained in data-processing was drastically increased in the period 1971 to 1973 in order to meet immediate requirements. By 1973 the number had returned to normal.

An apprenticeship is an employment relationship of a special kind, involving both an employment relationship and a pedagogic relationship, and it is valid for a limited period of time. Both for the enterprises entrusted with the training and for the future skilled workers, rights and duties form a legal relationship warranted by signing a deed of apprenticeship. The duties of the enterprise include full responsibility for supervising, planning and conducting vocational training, and guaranteeing the future skilled worker a job which is commensurate with his or her training. An amendment to the deed or premature termination of an apprenticeship is subject to the consent of government bodies. An apprenticeship cannot be terminated without notice. The training must be organized training in such a way that the apprentice attains the desired skill level by the end of the period of apprenticeship.

(c) Aims and content

In the GDR, as a rule, a trainee takes a two-year training course, during which he or she acquires a technical school entrance qualification, or a three-year course, simultaneously by acquiring a university-entrance qualification (vocational training plus Abitur). At present one in three apprentices is trained in one of the 28 advanced basic trades. These are skilled trades of wide scope, requiring the basic skills and an acquaintance with technically and technologically similar production processes, facilitating job-related specialization. A broad foundation of general and special knowledge makes it possible for the skilled worker to adapt easily to changing job demands and to develop his versatility.

There is a clear connection between training in basic subjects and job-related specialization. The structure of skilled-worker training is in line with the dynamic development of the productive forces, and enables skilled workers to improve their knowledge continuously.

Theoretical training has for a long time been closely linked with practical training; thus the quality of skilled workers' training can be continuously upgraded, and they are in a position to participate in the organization of their jobs and in the solution of complex technical and economical problems.

Both practical experience and scientific investigations testify to the necessity of moulding the relations between theoretical and practical vocational training in such a way that, relying on sound theoretical knowledge, the skilled workers will acquire solid practical skills.

Education through and by work is a major principle in this process, and brings about an effective relationship

between general education, education in basic subjects, and job-related specialization. Skilled training is based upon the idea of linking job-related specialization to a sound general education, to reach a high degree of flexibility and facilitate further qualification. Basic subjects taught in the comprehensive schools familiarize the apprentices with the fundamental principles of science and technology and deepen the knowledge they have gained so far.

In a systematic and scientific way, the future skilled workers learn something about the laws, general principles, rules and theories governing technology and economy and underlying most of the production and working processes. The basic working principles of the technical equipment to be handled, fundamentals in the fields of mathematics, natural sciences and economics and the social objectives of technology are examined. The aim is to include the integration and differentiation processes which take place in society, science and production, in education. Basic laws, principles and theory in disciplines such as mathematics, rationalization and automation, process engineering, etc. are increasingly taken into account. Knowledge is imparted which supports theoretical understanding and the practical mastery of tasks in the production and working processes of technical and technological jobs and specializations.

Moreover, education in basic subjects enhances the development of personal motivation, attitudes, convictions, behaviour patterns, habits and other qualities in the skilled worker. General education in basic subjects comprises the social sciences, mathematics, natural sciences and technical sciences, which are compulsory for all skilled trades - as is physical training, and the curricula are systematically improved and extended as training proceeds. Job-related education in basic subjects covers theoretical and practical vocational knowledge which applies to more than one skilled trade, or several specializations within one trade. Advanced instruction in the fields of mathematics, natural and social sciences, which is necessary to understand the technical problems of the job concerned is closely related to the requirements of the trade concerned. The content of practical vocational training is determined by the planned or existing division of labour in the specific field of technology.

The subject 'business management', for instance, makes apprentices familiar with the application of economic laws to the conditions in their enterprises, and gives them an insight into economic relationships. As future skilled workers, they learn how to make a direct contribution toward increasing labour productivity, making more efficient use of materials and fixed assets, job organization and improving the quality of the

products. The apprentices are prepared to solve practical problems of intensification, efficient and effective utilization of the labour potential, and scientific job organization.

The newly introduced subject "Socialist Law" provides the apprentices with basic knowledge in the fields of Labour, Family, and Civil Law, and the Youth Act. Basic Instruction in the technical subjects of electronics, process instrumentation and control engineering, and data processing, which is differentiated according to occupational groups, keeps the apprentice abreast of progress in rationalization and automation. There is extensive instruction in the subject of process instrumentation and control engineering in skilled training, with a large proportion of production, assembling, and repair work.

Job-related specialization is the dynamic element of the occupational structure. All experience shows that the introduction of scientific and technological innovations, the development of job descriptions, and job reorganization make new demands on the technical knowledge and the specific technical abilities and skills of workers. We found that this demand can best be met through constant development of job-related specialization, with the resultant benefit that there is no need to repeatedly update the concepts of skilled trades or job-related basic education.

A close relationship between vocational training and work within the production process proved to be a successful means of enabling apprentices to cope with changing work requirements and social processes linked with the job. In practical vocational instruction the emphasis is on the development of basic practical skills and abilities which are the preconditions for sound technical skills and good workmanship. This part of the training, therefore, which is held mainly in training workshops, laboratories and other facilities for complex technical and technological processes, accounts for some 65 per cent of the total training period.

The curriculum provides for three months of direct job-related specialization. During that time apprentices, as a rule, work at their future workplaces and are prepared for the transition to the status of skilled workers, to ensure that the specific requirements of the future sphere of work are met, and that by the end of their apprenticeship, apprentices are able to reach the performance level of skilled workers. The immediate integration of apprentices into the social relations of the work-teams exerts another favourable influence on their personality development.

Table 18 gives a general idea of the relationship between theoretical and practical vocational education, and the proportions of the various subjects and courses.

Table 18 - Curriculum for the training of skilled construction workers

General Education in the basic subjects
(theoretical instruction)

	Lessons:
civics	74
sport	116
business management	76
socialist law	36
fundamentals of electronics	54
fundamentals of process instrumentation and control engineering	84
fundamentals of data processing	52

Job-related education in basic subjects
(theoretical)

	Lessons:
materials science	108
theory of construction machinery	77
process engineering	69
structural theory	176
foundation engineering	40
technical drawing	77
management and planning of construction processes	42

Job-related education in special subjects

(practical)

	Lessons:
site assembly	1 750
reinforced concrete: reinforcement	1 750
reinforced concrete: shuttering	1 750
civil engineering	1 750
plastering	1 750
bricklaying	1 750

(practical courses)

	Lessons:
bricklaying/assembling	306
plastering/interior work	306
concrete and reinforced concrete	438
site assembly	175
technical training in machine operation'	88
enterprise-specific works	131

The "Young Innovators' Movement" makes another important contribution towards the vocational training of young people. It has come to epitomize the scientific, technological, and economic creativity of young people and their striving for technical and technological improvement. In 1980 more than two million young people, over one million of them apprentices and young skilled workers, were directly involved in this movement. Every year the introduction of exhibits from the "Young Innovators' Fair" into large-scale production proves highly profitable. But, what is even more important, young people learn to enjoy the pleasures and problems of creative research. They are encouraged in their creative thinking: their abilities to work within a scientific team are developed, and they learn to devote all their energies to achieving their aims.

There are many ways to encourage young people to become involved in tackling economic challenges, mainly through emulation of their more experienced co-workers, and integration into innovative activities familiarizing them with advanced working methods.

Emulation occurs throughout the national economy; the aim of the apprentices is to meet, in the process of work and learning, the state targets for high quality. The apprentices set themselves tasks which serve both to raise the level of their learning and work performance, and to expose them to the satisfaction of active involvement in the management and planning of production and social affairs. Emulation is the driving force in the management of collective work at institutions where skilled workers are trained, and the most comprehensive form of mass initiative among young people. For teams of apprentices, it is an important yardstick, since the monitoring of the plan makes it possible for them to assess its fulfilment and make comparisons with other teams, thereby gaining fresh impetus in the concept and approach of collective work.

2. Higher education

(a) Standards

Thirty years under a consistent educational policy has produced in the GDR a fully developed and efficient system of higher education covering instruction and training at engineering institutes, technical schools, universities and

colleges(1). Today, the system of higher education represents an important achievement of the working people.

Corresponding to an increasing social need for well-educated, highly trained specialists, a growing number of people have graduated from institutions of higher education, thus also meeting personal demands for education (see Table 19).

An equal right to education has become reality. As early as the mid-fifties, more than 50 per cent of all undergraduates taking full-time courses came from working-class backgrounds or co-operative farmers' families. The bourgeois educational monopoly was finally broken. (Progress in overcoming the male monopoly on many jobs is reviewed on pages 81 - 84 below, and in Tables 21 and 23).

Table 20 shows the increase in the number of undergraduates and graduates of institutions of higher education since the early fifties.

The number of employees who have graduated from a university, college or technical school increased between 1970 and 1979 from 716.3 thousand to 1,366.8 thousand. In 1970, 39.2 and 68.2 out of every 1,000 working people in industry were university and technical-school graduates respectively; figures rose to 65.0 and 118.3 respectively, by 1979. Thus, in 1979, of 1,000 working people more than 180 held certificates of higher education. In 1961 about 60 out of every 1,000 workers were certified. That is to say that the percentage of university and technical-school graduates in the national economy of the GDR has tripled over the past 20 years. At present, almost one in six employees holds a post-secondary certificate(2).

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(1) In accordance with the ISCED classification categories, which Unesco published and adopted at its 20th General Conference, education at engineering institutes and technical schools can be classified under Code No. 6, university and college education under Code No. 7. This classification best serves the essence of the education offered by these two types of facilities, and makes it possible to classify education in the GDR in an international system. However, the fact must not be overlooked that the informatory value of the ISCED categories is limited to a certain degree, which is normal in view of the social and structural differences among the various national educational systems. See Unesco, 1976b and 1978.

(2) Calculated from statistics taken from GDR, 1981b.

Table 19 - Graduates from institutions of higher education 1961 to 1980

	1961-1970	1971-1980
Total graduates	515 500	718 700
Colleges/universities	192 200	294 200
(of which full-time students)	131 100	215 700
Graduates of technical schools	323 300	424 500
(of which full-time students)	167 900	238 100

Source: GDR, 1981b.

Table 20 - Undergraduates and graduates of institutions of higher education, 1951 to 1979 (in thousands)*

Year	Undergraduates			Graduates		
	total	full-time	part-time and evening	total	full-time	part-time and evening
			Technical schools			
1951	32.8	31.8	-	6.9	6.9	-
1955	94.8	57.0	37.8	15.7	12.6	3.1
1960	126.0	47.3	78.7	24.5	16.4	8.1
1965	173.6	50.8	61.0	33.6	15.4	17.8
1970	167.2	62.8	101.8	36.3	18.3	16.5
1975	156.4	84.2	71.9	43.0	20.4	22.5
1979	169.6	100.9	68.6	39.7	30.0	9.5
			Universities and colleges			
1951	31.5	27.8	3.7	4.6	4.6	-
1955	75.1	60.1	14.6	7.6	7.5	0.1
1960	99.7	73.0	25.8	15.0	11.9	2.7
1965	111.6	74.6	32.9	20.9	13.7	6.1
1970	143.2	99.9	37.6	22.3	14.6	5.2
1975	146.9	103.1	25.4	36.5	25.2	8.8
1979	129.1	104.3	15.0	24.6	20.8	1.9

*Discrepancies due to special forms other than full-time, part-time, and evening study.

The above data clearly show that higher education has become available to a much wider segment of the population over the past 30 years. The development of a socialist intelligentsia was formerly characterized by conflicts. Since the founding of the GDR, however, we have been able to anticipate problems from time to time on the basis of detailed scientific analyses, and to reconcile them with the help of long-term education programmes leading to fundamental reforms of education in general and of its various components in particular(1).

Some of our salient problems have been the following:

- In the late sixties the number of graduates lagged behind the demands of the national economy for highly trained staff (particularly in the technical disciplines).
- Structural training disproportions developed in certain disciplines, closely related to scientific and technological progress.
- Curricula and syllabi were not sufficiently adapted to the latest developments in society, science and technology.
- Management and organizational structures did not match the integration and specialization processes which took place in science and technology and might have given people a good opportunity for democratic involvement.

At present, about 23 per cent of the young people in the age group eligible for university studies register for full-time studies at institutions of higher education, ensuring good use of intellectual potentials and personal resources for the growing national economy.

We have described higher education and its integration with the manpower potential of the national economy in a rather simplistic way. What is needed is a more detailed description of the educational aims and contents of the two levels of higher education.

(b) Technical school training

(i) Types:

There are two types of technical schools:

- those for the training of engineers and economists;
- those designed to train students in medicine, education, and the arts.

(1) Educational reforms have served in the past to adapt education to new stages of social development. The Law on the Integrated Socialist Education System (1965), amended by the 3rd reform of higher education (1968), led to the successful development of higher education along the lines of an advanced socialist society.

The first type of training presupposes successful completion of the 10-year comprehensive school, and usually two years of skilled training. The technical school education, which is based upon that educational standard, averages three years, and leads the student to a second, 'technical school' vocation involving high qualifications. Often vocational training is not immediately followed by entry into a technical school, but by a period of work in the vocation learned. This path is typically followed by engineers and economists (see GDR, 1979a, p.124-5), and schools of this type are often referred to as engineering institutes.

Training for these mid-level skills is characterized by alternating educational and working processes, and combines a high theoretical level with a wide range of practical skills and experiences in the working environment. Decision-making functions can be assigned to these graduates after fairly short periods of time on the job. Another important point is that this type of education enables many working people to acquire higher levels of technical training in either full- or part-time study programmes. Full-time studies are usually preferred by young skilled workers, but older workers who have discovered their need for higher education only after years of working are usually interested in part-time studies. (see Knauer et al, 1972, p.228, 231-2).

In the second type of technical-school education, the first vocation learned is a technical one acquired at the ten-year comprehensive school, immediately followed by three or four years of training at a specialized school. Graduates acquire a solid foundation in basic subjects, and a job-related specialization that goes beyond that of a skilled qualification. They have a higher standard of general education which, because of its vocational orientation, forms the groundwork for the specialization to follow (see GDR, 1979a, p.129-30 and 134).

In 1979 some 62 per cent of all undergraduates taking courses at institutions of higher education were women(1). In 1980, 35 out of every 100 univeristy and college graduates, 58 in 100 technical school graduates and 45 in 100 skilled workers and supervisors were women. If equality of men and women is to be achieved and the groundwork laid for an equal position in society, the traditional (i.e. capitalist-oriented) division of labour and training must be abandoned, and women employed in vocations which used to be dominated by men (see Tables 21 and 22).

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(1) This figure reflects mainly the high percentage of women students (about 83 per cent) in full-time technical school courses and the high percentage of women in disciplines such as medecine/health care and education.

Table 21 - Percentage of female students in technical schools in 1980

Branch	Students	
	Total (in thousands)	Female (in %)
Technology	44.4	32.8
Medicine/public health	47.1	97.7
Agriculture	10.4	47.7
Economics/Political sciences	39.4	83.9
Documentation/library science	2.2	83.5
Culture and sports	0.7	49.5
Literature and philology	0.1	90.2
Arts	1.4	63.7
Education	25.5	83.1
Total	171.2	71.9

Source: GDR, 1981c, p.38

The percentage of admissions of female applicants to universities or colleges could be steadily increased within the process of implementing their equal right to education and equality in society. While in 1964 the proportion of women admitted to universities and colleges for full-time studies was only 30.6 per cent it has been 48 to 53 per cent since the mid-70s. This tendency is reflected in the sex ratio of students at universities and colleges (see Table 22).

Table 22 - Percentage of full-time female university and college students in sciences

Science	Students	
	Total (in thousands)	Female (in %)
Mathematics/natural sciences	8.3	49.3
Technology	36.6	26.9
Medicine	13.3	56.3
Agriculture	7.7	48.8
Economics	18.4	59.6
Philosophy, history, political science, and law	8.9	54.1
Culture, arts and sports	3.4	36.6
Literature/philology	2.2	71.6
Arts	3.0	41.0
Education	26.1	74.4
Total	129.9	48.7

Source: GDR, 1981c.

The main emphasis in technical-school training is on the fields of technical sciences, economics, education and agriculture. Since 1975, when fields such as nursing and medical assistance, medical therapy, laboratory diagnosis, creche education and pharmaceutics were added to the curriculum of technical schools, medicine/health care has also become a main component of the training structure. These structures are shown in Table 23. About 13 per cent of the eligible age group is enrolled full-time in these areas in technical schools.

(ii) Aims and contents

Training at technical schools is mainly based on the directory of disciplines and on government training documents, which include curricula, teaching programmes and practical assignment schedules, and apply to all forms of study. They are prepared by commissions appointed by the Ministry of Higher and Technical Education or other Ministries under which specific technical schools are established. To fill the needs of society at any given time, technical school students can be trained in any of 245 different subject areas.

It is a tried and tested custom to include experienced technical-school lecturers, senior officers of enterprises and other institutions, and national government officials in the commissions, and to introduce the documents only after consultation with student representatives.

Technical schools unite general and specialized education, and gear it to the respective vocations. The proportions of general to specialized teaching, and of theoretical to practical vocational training are set to fit the needs of each subject area. Tables 24 and 25, the subject schedules of two selected disciplines, give an indication of these proportions (GDR, 1979a, p.133 et seq.)

These schedules at the same time testify to the complementarity of general or job-related education in basic subjects with job-related specialization, of theoretical with practical training, and of technical training with communist education in the general principles of technical school training. These training principles have been forged both during and after technical school training, giving graduates a vocational profile that forms the basis of their versatility. These graduates will continue to exert significant influence on the social qualifications structure.

While technical-school training is more specialized than university or college courses, given the nature of the graduates' future work, it is obvious that the aim is a balanced relationship of theory with practice, of specialization with versatility, which is indispensable if graduates are to be in a position to adapt to changing social

Table 23 - Technical school admissions, undergraduates, and graduates by discipline in 1979 (in thousands)

Discipline	Undergraduates total	Undergraduates full-time	Admissions total	Admissions full-time	Graduates total	Graduates full-time
Technical sciences	44.8	20.4	13.4	7.5	8.7	6.1
includes						
- mechanical engineering	14.5	5.6	4.2	2.0	2.5	1.7
- construction	7.2	4.6	2.3	1.7	1.6	1.3
- electronics	3.8	1.1	1.0	0.4	0.5	0.3
Medicine	46.8	41.3	16.3	14.3	13.3	12.7
includes						
- nursing & medical assistance	26.9	24.4	9.3	8.4	7.4	7.3
- med. & lab. diagnosis/ therapy	8.4	8.0	2.9	2.8	2.5	2.5
Agricultural sciences	10.1	6.6	3.5	2.5	2.9	2.1
include						
- crop production	3.1	2.1	1.1	0.8	1.0	0.7
- animal husbandry	3.7	2.4	1.2	0.9	0.9	0.7
Economic sciences	39.3	10.2	10.9	3.8	8.3	3.2
Other social sciences	2.1	1.1	0.7	0.4	0.5	0.4
Arts	1.4	1.2	0.4	0.4	0.3	0.2
Educational sciences	24.2	19.9	7.6	6.3	5.5	5.2
include						
- teachers for practical vocational instruction	4.4	1.2	1.4	0.4	0.5	0.3
- kindergarten teachers	6.1	6.1	2.3	2.3	1.7	1.7
- teachers for day-care and after-school centres	4.0	3.1	1.0	0.7	1.7	1.6
Total	168.7	100.7	52.8	35.2	39.5	29.9

Source: GDR, 1981b.

Table 24 - Simplified schedule of the subject area "process engineering in the metal-working industry"

Discipline: mechanical engineering

Total number of lessons	Subject	Lessons per subject
	Fundamentals of Marxism/Leninism	306
	German	36
	Cultural theory/aesthetics	36
666	Russian	108
(16 per cent)	Physical training	180
	Socialist labour sciences	54
	Socalist business management	162
	Automation	108
	Electric machines and motors	72
	Machine components	144
	Fundamentals of electronic data processing	72
	Information/documentation/ standardization	36
936	Technical mechanics	198
(22 per cent)	Materials engineering	90
	Manufacturing technology	306
	Machine tools	144
	Testing	72
	Design of manufacturing tools	252
1098	Process design	108
(27 per cent)	Preparation of manufacturing processes	216
915	Practical assignments	915
Total of lessons in all subjects (at the technical school)		3,240

Table 25 - Simplified schedule of the subject area "Nursing"

Category of subject	Subject	Lessons
Social science/ languages	Fundamentals of Marxism/ Leninism	216
	German	45
405 lessons	Russian	72
(8.7 per cent)	Physical training	72
Basic medical principles of nursing with respect to natural sciences and clinical aspects	Popular health care	27
	First aid	40
	Anatomy	72
	Physiology	63
	Fundamentals of medical biochemistry	36
	General pathology	45
	Fundamentals of dietetics	18
	Fundamentals of pharmacology	36
	Fundamentals of medical equipment	36
	Hygiene	54
	Psychology for nurses	72
	Cultural care of patients	18
562 lessons	Management, organizing and	
(12 per cent)	economy in public health	45
Special pathology	Internal medicine	117
	Surgery/orthopedics/urology/ anaesthesia	135
	Gynaecology and obstetrics	72
	Theory of infections and microbiology	45
	Psychiatrics and neurology	54
	Ophthalmology	24
	Dermatology/venereology	24
802 lessons	ENT-therapeutics	24
(17 per cent)	Nursing	307
Practical training 2,857 lessons (61.8 per cent)	Practical nursing	2,857
	Total lessons	4,626
	38 per cent theoretical	(1,769)
	62 per cent practical	(2,857)

conditions and advancing scientific and technological levels in their future working environment.

Practical assignments vary widely with discipline and type of education, but they are inherent in technical-school training. The differences are reflected in content, form and duration, and in the importance of the assignment within the course of study. Usually these assignments make students acquainted with the requirements of their future profession, most often directly from their future sphere of work, sometimes even at the future workplace. For engineers and economists, practical assignments are given in the last term of the course of study, during which the students must also submit and defend their final papers. Graduates of technical-school training acquire vocational profiles which make them highly desirable mid-level specialists, in demand in all spheres of the national economy.

C. University and college training

Being important centres of science, teaching, research and continuing education, universities and colleges are the highest institutions of education within the integrated socialist system.

(i) Standards

As seen in section 1, science and education penetrate all spheres of material production, social relations and the intellectual and cultural life of our country, on an ever-increasing scale. They become more and more decisive factors in economic growth, scientific and technological progress, productivity and efficiency in all spheres of society. The training potential of universities and colleges has been significantly extended, and an efficient system of correspondence, evening, and continuing education courses developed. In 1977 some 3,200 graduates of universities and colleges took their doctors' degrees, and about 350 obtained advanced doctors' degrees (Dr. sc.)

Among the disciplines universities and colleges offer for training, fields such as the technical sciences, education, economics and medicine attract the largest number of trainees (see Table 26).

The number of full-time students in the dominating age groups, 18 to 23, has almost doubled over the past 30 years (see Table 27).

Table 26 - Undergraduates in university and college courses, 1960 to 1979, by discipline (in thousands and in percentages)

Discipline	1960		1965		1970		1975		1979	
	1,000	%	1,000	%	1,000	%	1,000	%	1,000	%
Mathematics/ Nat.Sciences	9.1	9.1	9.3	8.3	13.6	9.5	10.3	7.5	8.4	6.5
Technology	23.7	23.7	28.3	25.4	46.0	32.1	40.2	29.4	38.1	29.5
Medicine	12.1	12.1	14.4	12.9	9.6	6.7	10.5	7.7	13.1	10.1
Agriculture	6.9	6.9	6.6	5.9	6.9	4.8	6.9	5.0	7.2	5.6
Economics	15.6	15.6	12.1	10.8	20.6	14.3	21.2	15.5	18.9	14.6
Philosophy, History, Political Sciences and Jurisprudence	5.6	5.6	4.3	3.9	7.1	5.0	9.1	6.6	8.7	6.7
Culture, sports and the arts	1.1	1.1	1.6	1.4	2.2	1.5	2.7	2.0	2.9	2.2
Theology	0.6	0.6	0.6	0.5	0.5	0.5	0.3	0.3	0.4	0.3
Literature and Languages	1.4	1.4	1.0	0.8	1.3	0.9	2.0	1.5	2.1	1.6
Arts	1.8	1.8	1.6	1.4	2.2	1.5	2.6	1.9	2.8	2.2
Education courses in all disciplines	22.0	22.1	31.8	28.5	33.2	23.2	31.0	22.6	26.5	20.
Total	99.9	100	111.7	100	143.2	100	136.8	100	129.1	100

Source: GDR, 1981b.

Table 27 - Number of admissions to university and college studies as a proportion of the 18-23 age-group, 1951-1980

Time	In percentages
1951 - 1955	about 5.7
1956 - 1960	" 6.3
1961 - 1965	" 8.4
1966 - 1970	" 10.1
1971 - 1975	" 10.6
1976 - 1980	" 9.9

Source: GDR, 1980c

(ii) Prospects

At the end of the 1970s an evaluation (see GDR, 1980d and Socialist Unity Party of Germany,1980,p.363 et seq.) was made on the basis of comprehensive scientific analyses of development in higher education, and its prospects for meeting the demands of the 1980s. A number of important problems emerged:

- objectives and methods of training for students and young academics must gradually be made more specific, and their qualitative level raised;
- the ratio between basic theory and specialized knowledge must be reassessed and optimized. It is necessary on the one hand to see to it that all possibilities in the curricula are fully exploited; on the other, to allow for the changing social requirements, the latest findings in sciences and the requirements of an efficient study course, and to constantly redefine all the regulations for training and education;
- the value of study time as a productive phase in the life of a young person must be improved, the extent to which a student is answerable for his own period of study must be increased, along with his willingness and ability to perform independent scientific work;
- the research capacities of universities and colleges must be more closely aligned with the needs of industry and with those of other scientific institutions, concentrating particularly on issues central to the national economy and

to science. Through close cooperation between colleges and the working world, the research results obtained in colleges can more quickly benefit the national economy, and at the same time stimulate the students and young academics. In short, the contributions of universities and colleges towards solving the basic problems of the material, technological, social and cultural development of society are to be increased and concentrated more closely on practical needs;

- the encouragement of a generation of efficient young scientists must assume greater importance, with a view to future scientific development;
- achievements in the field of further education must be improved considerably and restructured so as to improve efficiency in aplying new scientific knowledge to practical activities.

The inalienable right to a university education can thereby be more fairly and successfully guaranteed.

(iii) University entrance:

The basic requirement for admission to one of the universities or colleges is passing the final school examination, that is to say, an Abitur or its equivalent. The aim being to make it possible for all gifted young people, and older people who have been working for some time, to have the opportunity of a university education, several means of qualifying for university entrance are available.

Upon completion of study at a 10-year polytechnic comprehensive school it is possible to qualify for university studies in the following ways:

- by attending an extended secondary school for two years.
- by taking vocational training for three years with Abitur
- by taking a one-year preparatory course at a university or a college (young skilled workers often choose this option)
- Abitur or special examination evening courses
- continuing study at a university or college after leaving technical school.

This range of possibilities guarantees the talented young people from all classes and walks of society a real opportunity to study at a university or college, and effectively prevents dead ends along the route to higher education and qualification. It is thus an important factor in reproducing the qualification structure of society on a high level, and in giving talented and gifted individuals full scope for developing their abilities under conditions contributing

not only to self-realization in study and work, but to the satisfaction of their social aspirations.

(iv) Aims and contents

Universities and colleges must be able to train highly qualified specialists, able to take their place in social and professional life as cultured individuals with wide intellectual horizons. They should be conspicuous for their genuine interest in the well-being of the people, their thirst for knowledge and creativity, their sense of responsibility as citizens and their activity within the community. In both their private and their working lives they should be guided by the ideological principles of the working class (see GDR, 1979a, p.163).

There are basically three sets of courses that prepare students for working life:

- general basic training: provided in all basic disciplines; in certain respects, it serves as transition from the lower to the more advanced levels;
- basic training in special subjects: provided in related special subjects pertaining to one basic discipline;
- specialized training: determined by the nature of the particular special subject.

General basic training embraces the social sciences, Russian, a second foreign language chosen by the student, physical education, and military or civil defence training. Intensive study of working class philosophy is characteristically combined with participation in the many aspects of social life. Acquaintance with theory, followed by practical social community work, constitutes a character-forming experience (see GDR, 1979a, p.165 et seq.).

From their basic training in special subjects students gain solid theoretical insights into those branches of science which will be important to their future work. Such insights are essential to the creativity of their later activities, to the continuous acquisition of scientific knowledge throughout later life, to the ability to adjust to the new demands of work, and to future versatility.

The more extensive the training, the better equipped the future graduate will be to cope with the changing demands of working life. Each basic discipline comprises a number of special subjects, and relates to a wide range of scientific disciplines. The basic discipline of civil engineering, for example, with its 9 special subjects, includes an introduction to civil engineering, mathematics and descriptive geometry, automated information processing, technical physics, technical mechanics, soil and rock mechanics, hydraulics, the strength

of materials, statics, geological engineering, building and working materials, engineering geodesy, structural theory and technical drawing, reinforced concrete construction, metal construction, technological development, socialist economics, industrial science, environmental management and ecology (see GDR, 1979a, p.167).

During his specialized training the student gains knowledge which will be essential to him in his future work. He is offered a wide range of compulsory and optional subjects by means of which he can increasingly determine the shape and content of his own training.

Scientific research has confirmed the imperative that close links between study and everyday life, between theory and practice, be the main consideration in determining the course structures. General, specific and special features form the basis on which the curricula are worked out, and the knowledge to be imparted is selected and integrated into them. All possibilities for the development of the students through the extending and deepening of theoretical knowledge and its practical importance and application are exploited during their training, and the greatest importance is attached to those aspects of a course of study which directly link scientific study with practice.

The salient application of this principle is constituted by the periods of practical assignment. The practical assignment for engineering students, for example, fills an entire term, that for students of economics lasts for 12 weeks, and there is a long period of practice teaching for student-teachers. In line with the specific aims of their training, students gain the practical knowledge and experience necessary for their future employment, and carry out scientific investigations, which are, for the most part, directed towards solving the particular problems of the firm or institution in which they have done their practical assignments (see GDR, 1979a, p.168-9).

This concept of education, worked out during the 1970s, has proved in practice to be both feasible and significant for the future. It has the stability which is essential to thorough training, and is at the same time flexible enough to allow adaptation to new scientific findings and practical requirements. Within the training sector there are 90 different curricula and more than 1,900 teaching programmes, and these form the basis on which study patterns will be shaped in the 1980s. It must not be overlooked, however, that continuous reassessment and up-dating is to be the prime consideration of all university lecturers and scientific advisers. Some of the objectives envisaged are as follows (GDR, 1980d, p.53 et seq.):

- on the basis of standardized curricula, training processes should follow distinct paths worked out according to the needs of both the field of endeavour and the individual student; the dialectic of centralization and differentiation in university education should be promoted; all talented and gifted young people should be recognized and encouraged right from the beginning;
- sound basic theoretical instruction should be reinforced so that future graduates will acquire all the basic knowledge essential to dealing with the tasks which will confront them in later life, and will not set out equipped with only preconceived ideas;
- all new scientific knowledge should be included in the curricula, particularly in the borderline areas of the traditional disciplines. "It is, of course, objectively impossible to equip every student with the sum total of the knowledge available in his particular subject, all the relevant subsidiary disciplines and in borderline areas too, and then simply to add on all new developments. Therefore ... new integrative approaches must be searched out, new requirements fulfilled within the framework of existing teaching contexts, or the new must replace the outmoded without increasing the number of lectures or volume of time" (GDR,1980d,p.55).
- industry needs versatile and well-trained graduates who can do their jobs without taking too much time to familiarize themselves with the tasks to be fulfilled. The solution to this problem is not to be achieved by setting up a large number of specialized courses of study, but by rationally linking instruction with the systematic familiarization of students with their tasks, and advanced professional training along planned lines;
- to achieve the objectives and attain a high standard of education, for their future employment and for their personal development, students must take part in research. This is the reason for striving for a good balance between classwork, practical experience, private studies and research, and the organic structuring of all facets of practical training in the concept of education as a whole.

This strategy of continual reassessment of training requirements, oriented towards these particular problems, should bring about the high degree of stability and flexibility which is essential to the never-ending process of adapting the training of qualified specialized personnel to meet the changing demands of their chosen careers.

3. Correspondence and evening courses

Correspondence courses and evening classes, provided by institutions of higher education for people who are already working-so that they need not interrupt their employment-have proved to be excellent means of evolving a qualification structure which is of optimum value to the economy, as well as fulfilling the wishes of individuals with regard to their education. It will be seen in Table 28 that tens of thousands of skilled workers have acquired their qualifications in this way.

It is possible, after many years of experience with correspondence courses and evening classes, to draw conclusions as to their function in the society, which has changed with changing social conditions, and is still in the process of changing (see GDR, 1980c, p.56, and Walter, 1977, p.37-8).

These methods of study were introduced at the beginning of the 1950s. During that decade of social development they contributed significantly towards the breakdown of the system which granted educational privileges only to the bourgeoisie. Working people who had proved their reliability during the anti-fascist, democratic, socialist construction or had not been entitled to a higher education under former capitalist conditions-gained their qualifications by means of these courses which, at the same time, contributed significantly to the establishment of a socialist intelligentsia closely linked to the working class.

These methods of study offered to personnel of working-class or rural background holding executive posts in the industrial, state or educational system the possibility of acquiring the knowledge and qualifications necessary for their work, and opened up the way to satisfying the demand for higher education and qualification which was growing amongst the highly qualified skilled workers and mid-level executives throughout the period of socialist development. In the fifties, those who were already employed often made use of correspondence courses and evening classes as an opportunity of acquiring qualifications which were important to their work, but nowadays it serves almost exclusively as a means of preparing for some aspect of work which is to be undertaken in the future.

The data in Table 28 shows a downward trend in these types of study corresponding to the change in their social function.

Wolter(1977) gives the following as reasons for this trend:

- the need for qualified personnel on a national scale has levelled out;

- those age-groups from which correspondence course students have traditionally come now have wider access to full-time study at universities;
- the drop represents a response to the expansion of these methods of study during the middle and towards the end of the 1960s.

Table 28 - Proportion of students in correspondence and evening courses in the total number of newly registered students in higher education (in thousands and in percentages)

	Students registered in technical schools			Students registered in universities and colleges		
Year	in 1,000s	external students	prop. in %	in 1,000s	external students	prop. in %
1951	...	...	...	11.4	1.9	16.7
1955	...	...	...	19.4	4.4	22.7
1960	57.8	25.8	44.6	30.1	8.7	28.9
1965	43.3	20.6	47.6	24.7	7.1	28.7
1970	56.6	32.1	56.8	44.0	10.1	22,9
1975	52.3	17.7	33.8	34.4	4.3	12.5
1979	53.00	17.6	33.2	32.3	2.9	9.0

Year	Percentage of correspondence and evening-class students in total enrolment: Technical schools	Universities and colleges
1951	...	11.7
1955	39.8	19.9
1960	62.4	25.8
1965	53.8	29.5
1970	60.8	26.2
1975	45.9	18.5
1979	40.4	11.6

Source: GDR, 1981b.

This assessment is endorsed by the fact that, as a parallel to the downward trend, the number of younger students in this type of education is increasing.

Wolter (1977, p.38) exposes a new social aspect for the future development of this method of study when he stresses "that in the future a new social motivation ... will be effective, and that is the wish to prepare for a second stage in one's working life. At the moment, many young people, especially those who have had vocational training plus Abitur and who have all the qualifications necessary for admission to a university prefer immediate employment as skilled workers. It can be expected that a proportion of them will wish to take up some form of higher external education later on in their lives when they have taken their places as full members of the social community (having families, homes, etc.). The security offered by the socialist society, the high status of skilled workers, their high rate of pay and the certainty of the opportunity for further education later on in life probably constitute the basic motivation for the behaviour of these young citizens."

Correspondence courses, which attract more external students than do evening classes, are characterized by a "combination of longer periods of exclusively private study with teaching sessions in the form of consultations, lectures, practical assignments and practice" (GDR, 1980c). Of these it is obvious that private study will be the most significant element in the acquisition and assimilation of knowledge.

Success of correspondence course study depends to a large extent on the degree of security provided to the student, who for the duration of his studies (about 6 years for a university or college diploma) must have proper conditions for study if he is to take on the double burden of work and study. External students at university level are given, by law, 36 to 48 days of paid leave from their normal employment, depending on their special subject, plus leave of up to three months in the final year of studies for the completion and defence of a dissertation. A similar arrangement exists for external students at technical schools, although the period of leave is somewhat shorter (24-36 days per year of study). Lesson material and study guidance notes are provided free of charge, travel to the place of study is subsidized by the delegating firm, etc. This network of social opportunity points up the fact that, in the socialist society of the GDR, increasing one's qualification by means of correspondence courses and evening classes is not seen as an exclusively private affair but as a right and an obligation of both the individual and society.

Anybody examining the total cost to the community of external education will quickly see that this is in no way a

cheap method of training in comparison with full-time education. Although a superficial comparison of direct per capita costs, i.e., those incurred directly by the budget for external and those for full-time students, shows that the cost of training an external student is about two-thirds of that for a full-time student; these figures ignore the heavy burden of indirect expense incurred by society.

There is no difference between the objectives and content of external and those of full-time studies, and the final examination is the same. The differences are strictly limited to the means and methods.

One aspect of basic organization which enhances the study conditions of external students is the division of the study period into two consecutive parts. Central to the first period of study - (which usually lasts for two or three years) - is the basic theoretical training, which is uniform at all universities and colleges. The advantage is that the external student is not obliged to remain with the particular institution where he first registered. He may, if his job situation changes, complete this part of his studies at a different institution which is more conveniently situated, the so-called consultation centres. The second period of study is more subject-specific and lasts through the final examinations. During this time the student must remain with the institute where he is registered and where his particular specialization is taught. Similar rules apply to external study at the technical schools, which incorporate a broad complex of subsidiary establishments and consultation centres.

Finally it can be emphasized that correspondence courses and evening classes, in their position as indisputable elements of socialist educational policy, will contribute, both now and in the future, towards the qualification of large numbers of working people in a manner suited to their vocational and social situations, the changing conditions of production, new demands of scientific and technological advance, and the development of society as a whole. These programmes are also vital to making sure that the intelligentsia is drawn from all classes and levels of society.

4. Transition to the employment system

(a) The applicability of qualifications

The quality of an education is proved in occupations in which the knowledge, capabilities and skills acquired are put to use. Vocational performance therefore occupies a central position in the assessment of educational acumen, and

sociological research shows that success in work ranks very high amongst the ambitions of young people.

The transition to the vocation is not, of course, the concern of the apprentices or graduates alone, but of society as a whole. It is expressed not least in the legal obligation of state organs, colleges and universities as well as enterprises and institutions, to make use of every possibility for ensuring trouble-free transition to efficient working life. The preoccupation with vocational employment is an expression of the effectiveness of the GDR in applying the constitutional right to work. Depending on qualifications, individual abilities and interests, every young person must be given employment which is adequate to ensure security in the society(1).

A basis for smooth transition to working life lies in computing indices of the expected number of students and apprentices, as well as newly registered workers and graduates, as an integral part of the national economic plan (see section 3). In this way the high-level planning of the employment of students, apprentices and graduates can be supplemented by meaaures taken on a lower level (see GDR, 1971, on planning regulations and guidelines for companies for the placement of skilled workers), aimed at finding jobs which are specifically suited to the qualifications of the graduate.

The degree of efficiency in the use of the knowledge, abilities and skills gained through education, and of qualifications which have been enriched by practical experience in the work process and in other spheres of community life, is a yardstick for determing the quality and effectiveness of vocational training. This socio-economic phenomenon, whose effect is being investigated in the GDR, is the social proving ground of the coming generation in the work process and a fundamental criterion of the applicability of qualifications.

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(1) This social tenet is reinforced by

- the demand for full employment laid down in Article 55 of the 1945 Charter of the United Nations,
- the recognition of the universal right to work in Article 6 of the International Covenant on Economic, Social and Cultural Rights of the United Nations, 1966, and
- the principle of respect for human rights and fundamental freedoms and their implementation in point 7 of the Recommendation Concerning Education in the Spirit of International Understanding, Co-operation and Peace and Education Relating to Human Rights and Fundamental Fredomes,Unesco, 1974.

The aim is to

- provide all the conditions necessary for the physical, mental and moral development of young people in social practice, particularly in their work;
- reach a high standard of development in the work of young people, in the degree to which they become expert at their jobs, in their participation in science and technology, and in leading and planning national economic processes.

Problems in the applicability of qualifications must be seen in connection with the increasing demands of the national economy as well as of science and technology. The criteria and reference numbers by which results can be measured are as many and varied as the qualifications themselves.

Applicability is not solely concerned with the work process. Nor is it exclusively bound up with putting vocational knowledge into practice. For example, a skilled construction worker will, after completing his training at a technical school, university or college, or after having become a teacher, continue to use his qualification as a skilled worker, though to a reduced degree. Even in leisure time qualifications may be put to indirect uses, in social work for example, in bringing up children, or in pursuing many different individual interests.

Socialist society is interested in an optimum usage of qualifications, which presupposes a wide and long-term forecast of the extent and nature of the qualifications which will be necessary, and does not imply that in every instance a particular vocation could or should be followed for the whole of an individual's working life. For various reasons, it may not be possible, and may not be advantageous to society:

- the structure of the system of education may make it possible to move into a higher qualification bracket;
- changes in the structure of the national economy, as a result of changing demands, specializations, measures of rationalization etc., may lead to changes in the jobs, places of work or qualifications of individuals or groups of workers;
- scientific and technological advances may lead to changes in the means, techniques, or objects of work, even if the production process is left unaltered or only slightly modified;
- a change of job may be beneficial to the enterprise (about 50 per cent of all skilled workers who change their vocations do so at the request of the enterprise);
- changes in personal circumstances or motivations may force a change in the way qualifications are utilized, or a complete change of job. For example, a woman may take up a

job for which she has not been trained, or part-time employment, as a temporary measure as long as her children are small.

Qualifications are more or less fully applied according to the ability and willingness of the individual on the one hand, and on the other hand, on the opportunities offered by society. All the research which has been done in this field shows that the interests of society and of the individual are closely knit and-except for temporary contradictions-any problem may be readily solved under the socio-economic conditions of the GDR.

Ability to apply qualifications depends fundamentally on the opportunity to acquire vocational skills which are relevant to the specific demands of the job. Evidence of qualification in examinations is not always commensurate with proficiency on the job.

Willingness to apply qualifications implies above all a will to carry out the work in accordance with the particular demands of society and with the conditions prevailing in the region or enterprise concerned, which is bound up with mobility and versatility, and demands the exercise of adequate abilities, skills and qualities.

The opportunities for applying qualifications in society vary with the relationship between the need for workers in a particular field with particular qualifications, the number of qualified workers available, and the number of trainees already in the pipeline. Jobs must be proportioned to fit manpower in all respects, - quantitative, qualitative, temporal and geographical. As is shown by research into the use to which qualifications are put, they cannot be absolutely correlated in practice, because they are in a continual state of change and their development is dependent on many diverse conditions. Training and manpower planning systems, however, provide a framework within which it is possible to achieve an ever higher degree of correlation, and analyses of socio-economic requirements and the effects of changing employment structures provide essential bases on which to plan and balance this long-term process, which is increasingly helping to eliminate areas of conflicting interests.

(b) Transition of apprentices to work

Every skilled worker must be employed in accordance with his qualifications. The Labour Code of the GDR contains the legally binding stipulation that apprentices be assigned their future job in an enterprise six months prior to the termination of their apprenticeship, and offered an employment contract. The job must correspond to the training they have received.

During their first year of employment as skilled workers, apprentices enjoy legal protection against dismissal. For physcially and mentally handicapped young people, the deed of apprenticeship is accompanied by the designation of the future job. Just before they finish their apprenticeship, their instructors will make sure that all the preconditions for taking up the job have been met. Enterprises and industrial complexes are obliged to find employment in their own or in another firm for those few apprentices who fail to pass the skilled worker's examination. These jobs must conform with the apprentices' abilities and skills.

Research furnishes convincing proof of the fact that young people have great expectations upon entry into the working world. They want to get on well in their professional development, to progress through good performance in productive work, to make money, to furnish homes and marry and settle down. They endeavour to use their knowledge and skills to the best of their ability, to find satisfaction in their work, and to have the feeling that what they do is important. Work-related objectives rank directly under such values in life as health and happiness.

Gradual changes are occurring in the values of young women and their attitudes toward professional activity. Almost all of them intend to go out to work even after they are married. They are motivated not only by a need to increase their income but also by a wish to make social contacts.

New attitudes toward work are initiated whilst the young people are still learning, and from the beginning of their professional careers young skilled workers are assisted by the managers and members of their work teams. Arrangements are made which serve the promotion of young skilled workers. In personal talks their problems and development potentialities are discussed. When young workers are integrated into their work teams, special importance is attached to making sure they enjoy their work and take pride in their profession.

In this context the youth projects should be mentioned; these are special tasks in the national economic plan or the plan of an enterprise which are taken over by young work teams, the fulfilment of which can be measured. Centres of vocational education are also manned by young work teams. These are the first teams to which many young workers belong, and they are organized to help them to achieve great performances in production. In many sectors of the national economy young work teams play an important role as initiators of exemplary performance. All these forms of transition to work have contributed to developing in young skilled workers a feeling of devotion to work and of responsibility towards society.

On completing apprenticeship, one is expected to be qualified as a skilled worker. This implies

- efficient organization of training,
- entrusting the apprentices with tasks that fit the training programme and the needs of production,
- providing on-the-spot vocational training during the last phase of apprenticeship at the workplace where the apprentice will ultimately be employed,
- ensuring the employment of apprentices in accordance with requirements, training and qualifications.

The training of skilled workers is oriented towards a high degree of flexibility, which varies with personality as well as with the requirements of modern large-scale production. It calls for comprehensive vocational knowledge, abilities and skills, which a worker should have to master a sphere of work which is determined by the workplace, the professional specialization and the given trade, and to cope with new tasks, modern technologies and production processes.

If a skilled worker becomes proficient during the training period, it is possible to eliminate, or at least reduce considerably, the period of adjustment to the actual job. Thus the period of vocational adjustment is shifted largely into the training sector, and it has proved effective to include adjustment to the first workplace as part of vocational training.

The transition from training to work involves a number of those development-related problems which we have already discussed. At present the number of highly qualified skilled workers is growing faster than the number of adequate jobs. Society is, therefore, faced with the task of transforming and modernizing, through rationalization schemes and through the innovators' movement, all those jobs which are still simple, monotonous, and physically heavy.

Another current problem is that a number of young skilled workers who have changed jobs, companies, or occupations are now in jobs which are not suited to their qualifications. The fluctuation rate among skilled workers is dropping, but it is still very high, and analyses show that approximately 70 per cent of all workers who change their jobs are under 26 years of age. Research has shown that the highest turnover rate is found amongst employees who have worked for an enterprise for less than 3 years.

A good deal of attention is directed toward advanced vocational education for young workers.(1) This training is closely related to practice and connected with the professional perspective. The acquisition of up-to-date specialized

(1) This is much in keeping with the Recommendation on the development of adult education of Unesco (1976a).

knowledge and professional skills is linked with a deepening of education in the social sciences. For this purpose the enterprises take various qualification measures.(1)

(c) Efficiency in the training of skilled workers

In this section we would like to consider how the qualifications of young skilled workers are put to use, using as an example an investigation of the economic aspects of training efficiency in industrial enterprises (see Christopher, 1974). The first months and years of employment are of special importance, because as young skilled workers continue in their professions their commitment to the enterprise, profession and locality will normally increase, and be reinforced by such experiences as service in the armed forces, marrying and settling down. The desire of the very young skilled workers to be involved in interesting projects, and to become acquainted with a variety of working and living environments, puts the mobility of the age group above the average.

The efficiency of the educational component of the training and employment of young skilled workers has been analysed mainly in the light of educational economics. To this end various standards of assessment were applied, notably the degree of "fulfilment of the output norm" and of "observance of quality indices and specifications".

(i) Fulfilment of the output norm

The investigation indicated that the degree to which the output norm will be fulfilled is influenced by technological factors such as the condition and level of the instruments of labour, the knoweledge and skills of the workers, and their work experiences. Apart from the workers' knowledge and skills, the most decisive factor is their work experience. Also, such individual factors as readiness to engage in work, the wish to achieve high performance rates, and the intensity of work decisively influence the fulfilment of the output norm.

(1) Cf. section on training above, pp. 71-84

Table 29 - Degree of fulfilment of the output norm by young skilled workers in the first six months of their employment (in percentages)

	1st month	2nd month	3rd month	4th month	5th month	6th month
Average fulfilment of the output norm	96.3	102.4	104.9	104.0	105.8	113.3
Upper limit	118	121	132	131	125	126
Lower limit	41	75	72	85	80	96

Table 29 clearly shows the simultaneous decrease in deviation from the average fulfilment of the norm and a trend towards increased performance.

Downward trends in the fulfilment of the output norm often indicate that young workers intend to leave soon. What conclusions can be drawn from these data with regard to the training and employment of manpower?

- The objective of training with regard to the fulfilment of the output norm by the apprentices is, in general, achieved. The apprentices are in a position to meet the requirements of the labour process.
- The educational influence on the apprentices during the last six months of their training (in work teams) must be centred more on the development of a feeling of commitment to the enterprise.
- During their practical training the apprentices should be employed for as long as possible in their future work teams, so that their relations with their future work teams will be firm.
  In the first few months of young skilled workers' employment experienced workers should assume, wherever possible, some responsibility for their young colleagues.

(ii) Observance of quality indices and specifications

The quality of products is a measurement of the work done by the workers. Quality can be measured, for instance, by assigning the products quality marks or by calculating the

percentage of waste(1) in the total production. In the investigation in question (Christopher, 1974) the standard of assessment of the quality index was the average waste rate.

Table 30 - Product quality as measured by average waste rate

	1st month	2nd month	3rd month	4th month	5th month	6th month
Average waste rate	1.07	1.05	1.00	0.93	0.88	0.82
Upper limit	1.13	1.15	1.08	1.02	0.96	0.88
Lower limit	1.04	0.98	0.92	0.84	0.76	0.75

Source: Christopher, 1974

As shown in Table 30, the waste rate continuously decreased over the period. Here, too, individual values differ considerably from the average.

All these investigations contributed to improving the efficiency of the training and employment of young skilled workers. Moreover, it was possible to give the enterprises advice on how to conduct efficiency studies themselves.

To find out how the qualifications acquired can be put to use in the course of a whole working life, many other measurements, of an economic nature, must be computed. These include

- the duration of employment in the profession,
- the duration of employment in the enterprise,
- the rate of fulfilment of the performance requirements, including the output norm,
- professional development during the labour process and in other spheres of social life,
- degree of success in on-the-job training,
- transition to higher qualification levels,
- the performance of certain functions and tasks.

(1) Waste is that portion of the production result which does not correspond to the conditions laid down, through failures in the standards, samples, agreements and other specifications and thus to the characteristics required for the intended use. The waste rate is the ratio between waste and total production. It is an expression of the standard of work quality in an enterprise.

The duration of employment in one's profession is generally regarded as the most important indication of the degree of applicability of one's qualifications. It is not contradictory to other standards, but is regarded in connection with the social and economic conditions under which a skilled worker pursues his profession, and with the requirements of both the enterprise and society; it is maximum duration of employment in one's profession, i.e., the exercise during a whole working life of the particular profession which one has learned, that matters. It is also duration of employment that promotes performance and personality development, and makes optimal use of a person's creative potential.

Research shows that the first three months of work are of great importance to young workers. They join their work teams as independent members; they must stand the test of complicated situations and cope with problems of adaptation at the same time. This adaptation applies not only to the labour process itself, but quite often to social concomitants (e.g. problems involved in finding accommodation for a single person, or deciding what to do in one's spare time).

(d) Employment of graduates

New findings obtained from sociological studies on the employment of graduates from institutions of higher learning allow the following conclusion:

> "A demanding, interesting, creative and socially useful profession which is adequate to the training received and which makes the greatest demands on the individual is exactly what the majority of students are seeking ...a generation of students whose moral aspect has been formed in a society in which work, the performance of the individual, determines whether or not he will be respected and recognized by society"(GDR, 1980c).

With a view to satisfying these interests to the greatest possible degree, the procurement of work for graduates is painstakingly planned on a long-term basis. At all colleges and universities, special commissions discuss future employment possibilities with every student. These commissions consist of scientists and representatives of mass organizations (e.g.: the youth assocation); representatives of those enterprises where the graduates will probably be employed may be called in as well. The talks are conducted on the basis of the enterprises' job descriptions, which include field of activity, responsibilities, qualification possibilities, salary, etc. At the beginning of the last year of study, the employment contract is executed between the student and his future enterprise or institution.

This early finalizing of employment contracts not only guarantees security to the graduate but also makes it possible to:

- acquire or deepen specific knowledge during the last phase of study to prepare for the contracted professional activity;
- deal in their 'diploma papers' with relevant problems or subjects of research and development;
- settle personal problems (e.g. arrangement of accommodation, crèches or kindergartens for children, etc.) well in advance of starting work.

Very often stable and scientifically fruitful contacts are established with the future employer during the students' practical training.

The system for procuring these jobs promotes conditions which favour the selection of a job which is both socially and personally suited to the student, and makes optimal use of his or her intellectual capacities for the benefit of the people. The actual problem is in fulfilling all these conditions, ensuring in each particular case an efficient employment of the graduate, and utilizing and promoting his/her capacity.

(e) Employment in accordance with qualifications

The extent to which the employment of university and technical-school graduates accords with their qualifications is the decisive measure of the efficiency of their training and education. An analysis of the figures would be helpful to the employing enterprises in trying to fit employment to the qualifications of the university and technical school graduates applying to them. According to E. Dietrich (Poland, 1976), we must differentiate between two components of professional activity:

- The discipline-related component.
  The fact that the social division of labour by profession is structured horizontally is reflected, in the sphere of higher education, in the structure of the disciplines. The agreement or disagreement between the structure of the discipline and that of the professional activity parallels the extent to which employment accords with the discipline studied, and indicates the limits within which employment can be fitted to training.
- The qualification-related component.
  The degrees of difficulty associated with the requirements of jobs are outlined in the vertical structure of the social division of labour, i.e., in requirement levels, which can be matched by specific vocational training

levels. The difference between the qualifications needed for a given job and the level of training received is a negative measure of the extent to which employment accords with qualifications, and measures the limits within which the skills attained can be put to practical use.

Selection must be made from the range of employment opportunities according to both the discipline and qualification level of the prospective employee. In a general way, we can distinguish between the following groups:

- the employment of a graduate may be presumed to accord with his or her qualifications if the activity corresponds to the discipline and qualification level to a large extent. If the discipline-related and qualification-related components agree well, or fairly closely, the graduate is considered to be adequately employed.
- the employment of a graduate may be considered partially adequate, if at least one component of the professional activity is within socially justifiable limits.
- the employment of a graduate is defined as inadequate if neither component has been matched, or even approximated.

Recent sociological studies of these three groups may produce interesting results, of considerable importance in the future placement of graduates. Though no definite results are yet available, the tests made so far indicate that graduates are not yet consistently recruited in jobs that accord with their qualifications, and in the interests of the individuals as well as of society as a whole, the situation merits attention.

Schaefer and Wahse (1980)(1) devote a good deal of attention to the flexibility of university and technical school graduates. They define flexibility as the ability to engage in various activities within a given profession or related professions thanks to a wide range of knowledge and skills, or the ability to acquire such knowledge and skills without too great a drop in efficiency. It means first of all intellectual polyvalence, i.e., that broad and multifaceted development of intellectual faculties which makes it possible for a person to settle readily into a new job assignment in any of several related fields.

Schaefer and Wahse have developed a flexibility standard which measures the degree of qualification-based flexibility in various professions and disciplines, using manpower employment statistics (university and technical school graduates) in various sectors of the economy (see Tables 31, 32).

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(1) See also GDR, 1978, p.29 et seq.

Table 31 - Flexibility Standard of university graduates by economic sectors (in percentages)

	Basic discipline	Flexibility standard
1.	Economics	40.7
2.	Economics (Business economics)	36.6
3.	Political and social sciences	33.7
4.	Jurisprudence	33.2
5.	Economics (Cybernetics, electronic data processing, statistics)	32.5
.		.
.		.
.		.
10.	Educational theory	25.8
.		.
.		.
.		.
15.	Translating and interpreting (Romance languages)	20.6
.		.
.		.
.		.
25.	Journalism	16.4
.		.
.		.
.		.
30.	Transport	14.7
.		.
.		.
.		.
40.	Romance languages and literatures	11.4
.		.
.		.
.		.
50.	Mechanization in agriculture	4.7
.		.
.		.
.		.
60.	Comprehensive level teaching of physics	2.7
.		.
.		.
.		.
69.	Special school teaching	0.7
Average		13.5

Source: Schaefer and Wahse, 1980

Table 32 - Flexibility Standard of technical-school graduates by economic sector (in percentages)

Basic discipline	Flexibility standard
1. Economics	39.9
2. Economics (finance)	38.9
3. Economics (EDP, statistics)	31.5
4. Economics (business economics)	29.2
5. Social sciences	29.1
.	.
.	.
10. Librarianship and archive systems	21.9
15. Electrical engineering	18.3
.	.
.	.
25 Chemical engineering	15.1
.	.
.	.
30. Medical engineering	12.2
.	.
.	.
40. Leather industry	8.9
.	.
.	.
50. Agricultural machinery	7.0
.	.
.	.
60. Nursing and medical assistance	3.2
.	.
.	.
68. Kindergarten teachers	0.5
Average	13.3

Source: Schaefer and Wahse, 1980

These calculations included nearly 97 per cent of all university and technical-school graduates employed, and can thus be assumed to be highly representative. The general trend in both groups of graduates is clearly apparent:

- The economic disciplines have the highest degree of flexibility in the various branches of the national economy.

- graduates in the technological and natural-science disciplines are about average in flexibility, but those who have studied mathematics are above average (26.4);
- graduates of agricultural disciplines are rather low in flexibility;
- particularly low is the flexibility of medical personnel, pharmacists and comprehensive-school teachers of all subjects;
- the flexibiity standards within the social-science disciplines vary widely; they are very high in, e.g., economists, lawyers, philosophers and sociologists but very low in the disciplines of aesthetics and art.

Schaefer and Wahse also analysed university and technical-school graduates by field of activity-direction and management, design, research and development, technology, general administration-and within production spheres such as companies, etc. (see Tables 33 and 34).

Table 33 - Flexibility standard of university graduates by field of activity (in percentages)

Basic discipline	Flexibility standard
1. Transport engineering	54.8
2. Business economics/engineering economics	43.5
3. Civil engineering	42.2
4. Materials engineering	41.2
5. Mechanical engineering	40.7
.	.
.	.
10. Physics	26.2
.	.
.	.
15. Architecture	18.4
Average	36.7

Source: Schaefer and Wahse, 1980.

Table 34 - Flexibility Standard of technical-school graduates according to fields of activity (in percentages)

Basic discipline	Flexibility standard
1. Electronics	61.8
2. Automation	53.7
3. Textile, clothing and leather industries (chem.)	53.6
4. Shipbuilding	52.6
5. Scientific instrument manufacture	52.4
.	.
.	.
10. Business economics/Engineering economics	47.4
.	.
.	.
15. Transport	43.1
.	.
.	.
25. Power engineering	33.5
.	.
30. Public finance	27.4
.	.
.	.
Average	44.0

Source: Schaefer and Wahse, 1980

Enterprises in the production sectors of the national economy find graduates in engineering and engineering economics most flexible with regard to employment in different fields of activity. Less flexible, for instance, are graduates in the natural sciences and mathematics. The findings obtained by analysing and comparing the two flexibility standards are very interesting.

- Graduates in disciplines of a sector-specific character (low flexibility between economic sectors) can adapt as a rule, to a wide range of employment within an enterprise (high degree of flexibility between fields of activity).
- The flexibility standards arrived at must be assessed with reservtion, because they cover not only qualification-dependent flexibility but other factors.

Thus their absolute value is less interesting than the relations and orders which were observed.

- Moreover, the analysis of the flexibility standards does not take into account necessary changes in training, or necessary but extraneous educational contents in a discipline.
- In any case the flexibility standard can be used as an aid in forecasting and long-term planning, because tolerances in planning can be based on it. The lower the value of the flexibility standard in the individual disciplines (professions), the narrower the tolerance range in educational planning.

5. Further vocational education

There is a striking upward trend in the population toward improving levels of qualification. To encourage this interest in various forms and contents of continuing education, an imperative in furthering the socio-economic development of the GDR, the Programme of the Socialist Unity Party of Germany (1976, p.50) emphasizes" ... better opportunities for people to improve their general knowledge and to acquire a thorough knowledge of various fields of interest."

Decisions taken by state organs and by the trade unions reveal the GDR's basic orientation for the 1980s (see GDR, 1979b). In accordance with the conclusions of the Second World Conference on Adult Education (Montreal, 1960) adult education is an integral part of the country's system of education. The concern of adult education is to give all citizens the opportunity to continue their education throughout their lives, to promote systematic, well-rounded personality development, to develop each person's abilities and creative initiatives, to improve general and vocational education, to maintain progressive traditions and cultural values, and to arouse new interests. In accordance with the "Recommendation on the development of adult education" of Unesco (1976) the objectives, contents, methods and organizational forms of continuing education are governed by the requirements of enterprises and society, with due consideration to individual interests and desires of working people. In line with the objectives laid down at the Third World Conference on Adult Education (Tokyo, 1972), adult education is an instrument intended to prepare people for work in the productive sphere, and for co-operating in running an enterprise.

(a) The system

Whereas the main purpose of adult education has been in the past to enable people to complete their vocational

training, its main objective in the 1980s will be to raise an already high level of qualification even further, to get into qualitative step with the requirements of scientific and technological advance, and to increase the efficiency of the national economy.

Adult education is widely varied in content, method, and organizational form:

- training and continuing education for unskilled and semi-skilled workers is provided through the training facilities of enterprises, industrial groups, and agricultural cooperatives;
- opportunities for deepening and extending general qualifications are offered through evening classes, clubs, and community cultural centres;
- qualified skilled and supervisory workers are availed of instruction at technical schools or universities through close cooperation between enterprise facilities, evening study programmes, universities and technical schools;
- new findings in the social and natural sciences and modern technology are disseminated above all through mass organizations and scientific societies;
- postgraduate study courses for technical school and university graduates are held inside enterprises, at technical schools and universities, and at schools run by the mass organizations.
- continuing education is provided to managerial staff at institutes for socialist economic management, and at colleges run by the Socialist Unity Party of Germany, by the trade union movement and by the youth association;
- advanced instruction for selected groups of highly qualified personnel (e.g. teachers, physicians, etc.) is offered at institutions run by enterprises or economic branches, at universities, technical schools, colleges and academies.

(b) Objectives

Advanced vocational training is widely offered for the purpose of increasing the efficiency of the national economy. In accordance with economic policy and the requirements of scientific and technological advance, the provision of knowledge and skills is intended:

- to improve the quality and efficiency of work, notably in the development, introduction and mastering of highly productive technologies and processes;
- to improve the quality of products;
- to introduce and develop new products;

- to economize materials, energy, working time and plant;;
- to ensure continuation of production;
- to reduce costs and make more intensive use of fixed assets;
- to raise the level of management, planning and organization.

It is evident that enterprises and industrial groups bear a large measure of the responsibility for ensuring the timely preparation of all working people for the application of new scientific and technological knowledge in the development of new products and business economics. This makes it imperative to define the contents, scope and form of measures to encourage qualification. To select working people and win them over to some form of advanced education, and to employ them later on in accordance with their qualifications-all this is most important.

A priority aim of advanced education is the better utilization of the social labour potential. Manpower for new jobs or for multi-shift work on highly productive technical equipment must be made available mainly through relevant professional qualification and through release in the enterprise concerned. Where necessary, higher qualification levels must be acquired.

Advanced vocational education contributes to enforcing order, safety and discipline in the enterprises. Technical courses contribute materially, as has been proved, to ensuring the continuation of production in unusual situations. Participation in advanced vocational education is recognized by issuing licenses and/or certificates.

The content and methods of advanced vocational education are determined by the intensification of production, the development of science and technology, and the demands of continuously improving quality of work on the professional skills and social responsibility of the working people in all sectors of the national economy. Advanced vocational education is predominantly geared to increasing the knowledge and skills of the working people in the trade they have learned, and to the acquisition of new professional specializations.

Special attention is directed toward the advanced vocational education of women and girls. An essential factor in their continuing education is a network of social facilities. The organization of adult education makes allowances for the particularly heavy demands which are made on working women. Their higher education is provided in the form of special classes, in which lectures and seminars take place at times convenient for them. The educational facilities have placed outstanding teachers and up-to-date teaching aids at their disposal, so that they can overcome the historically-based disadvantages in their qualification level which make themselves felt even today, in certain spheres.

This is one of the ways in which Recommendation 3 on "Equal Opportunities for Women", formulated at Unesco's Third World Conference on Adult Education, is practically applied in the GDR.

(c) Advanced vocational training for skilled workers and foremen

Advanced vocational training of skilled supervisory workers is provided in tried and tested forms:

- courses, lectures, consultations, demonstrations at institutions for adult education,
- advanced education events at regular intervals,
- on-the-job training.

Courses at adult education facilities represent the most comprehensive and most important form. Annually, one in every three skilled or supervisory workers participates in such a programme.

Over the past few years the enterprises, groups and co-operatives have started to organize regular advanced educational events with a view to familiarizing skilled and supervisory workers continuously and systematically with the latest technologies and working methods. Programmes of advanced education range from one to five years; short courses at institutions for adult education from two weeks to six months, often alternately with on-the-job training. The Labour Code of 1977 provides for working people to be granted paid leave for up to six months a year for advanced vocational training.

The training of skilled and supervisory workers is related to their professions and tasks, and takes into consideration the needs of the enterprises and of the national economy. It is provided predominantly in the enterprises, groups, and co-operatives. Conditions there are best suited to serve the purpose of adult education, to enable people to improve their performance, to satisfy the desire for more knowledge, and to contribute to harmonious personality development in the interests of society and of the individual.

The enterprise academies, as they are called, constitute an important element in the GDR's system of education. They are public facilities for adult education, which are both run and financed by enterprises or groups. Participants are chosen by the enterprises in close co-operation with the trade unions. Courses are selected according to the needs of the enterprise, which are elaborated annually in collaboration with its trade union committees, and according to uniform state curricula which are compulsory in all enterprises. The

enterprise academies draw upon their knowledge and skills, as well as their experience in the profession and in life, and thus offer rational opportunities for training and continuing education to skilled and supervisory workers. In large-scale enterprises, the vocational school and enterprise academy are united to form the enterprise school, which provides vocational training at both the apprentice and advanced levels. They are further responsible for the polytechnic instruction of pupils of the comprehensive schools in their regions.

There are special opportunities for all unskilled and semi-skilled workers to acquire skilled qualifications. Older working people, who, years before, have been trained in a traditional skilled trade of rather narrow profile, have the chance to learn a second, modern trade if, for instance, modern technologies have been introduced in the enterprise or if a change of job has become inevitable. A skilled worker who wants to qualify in a second field or to learn a modern trade with a broad profile, or any unskilled or semi-skilled worker, is trained according to uniform state curricula. Forms and methods such as lectures, seminars, tutorial sessions, exercises and private counselling are adapted to the particular conditions under which adults learn, so that it takes less time to qualify as a skilled worker at an enterprise academy than as an apprentice-normally up to one year.

The advanced vocational education of skilled workers is closely connected with measures of rationalization in the enterprises. The enterprise managers are required by law to plan rationalization and advanced education together, and to ensure adequate educational groundwork. The teaching programmes of the enterprise academies include lecture series and individual speakers geared to the recommendations of rationalization schemes in the enterprises. In-depth study of mathematical natural science, technical and technological skills rank as high in the educational programme for skilled workers as economics.

The teaching staff at an enterprise academy consists of specialists in some specific branch of knowledge who have pedagogical abilities. They are supported in their educational work by university and technical school teachers and by the managerial staff of the enterprises.

Experienced skilled workers can qualify as supervisory workers at these academies if they have completed the ten-year comprehensive school, skilled training, and several years of professional practice. In their capacity as heads of work teams and as direct organizers of production, the supervisory workers bear a great deal of responsibility in the enterprises and groups. They are given training in leadership, in the selected field, in labour and business economics as well as in

teaching and psychology. It takes two years to qualify as a skilled supervisory worker, and training is mainly in the form of evening classes at the enterprise academy. Basic training is oriented toward qualifying in the field of managerial science, technical training in engineering and technology toward the professional requirements of the relevant industry; specialization in the form of practical training as a supervisory worker is adapted to the current requirements of the production unit.

Supervisory workers in the nationally-owned industry and qualified master craftsmen who already work in this capacity may also attend advanced training courses which are organized regularly at the enterprise academies. The continuing education of supervisory workers is an integral part of that for managerial staff in an enterprise. They attend lectures on the problems encountered in the fields of management, on teaching methods, psychology, philosophy, political economy, jurisprudence, environmental protection, labour methods, etc. The enterprise schools and academies of large-scale enterprises are recognized branches of technical schools and universities.

It was in the early fifties that the first agricultural co-operatives developed in the GDR, hand in hand with the development of new production relations in the country. During the past decade the transition to industrialized methods of production in the villages has progressed at a rapid rate. The former distinction between the work of an industrial worker and that of an agricultural labourer is now negligible. Mechanization and equipment technology have reached a level in agriculture which calls for further specialization and for the establishment of bigger production units. Farmers in the GDR have formed co-operatives in order to use personnel, material and financial resources with greater efficiency. The village academies are modern public educational facilities, and these have more recently been joined by academies run by the interfarm establishments. The desire for education in the country has mushroomed. Old and young cooperative farmers, women in particular, increasingly avail themselves of the educational opportunities offered, mainly in the winter months. Whereas in 1960 no more than 4 per cent of all farmers had completed skilled agricultural training, now 72 per cent of all thse employed in agriculture have done so.

For more than 30 years the adult evening institutes in towns and districts have had the character of public educational facilities, which see their special task in providing general education, including the teaching of foreign languages, in close co-operation with those of enterprises, villages, and groups. Through evening classes each person can avail him- or herself of the opportunity to complete the 10- or

12-year course offered by the comprehensive schools; and these schools, as well as the enterprise, village and interfarm academies, hold special preparatory courses in the evenings for those who want to study at technical schools or universities. These courses are addressed primarily to older skilled workers who for some reason have not been able to complete the 10- or 12-year comprehensive school programme. A great many evening courses and events are organized to fulfil the growing desires and needs for education in the social and natural sciences, art, literature, foreign languages, shorthand and typewriting.

There are many other means of improving one's technical and professional knowledge and skills, and consolidating one's general education. A few of these are the following:

- UNANIA, a society concerned with the dissemination of scientific knowledge, offers a wide selection of lectures and discussions in towns and villages and, recently, also in the enterprises. Renowned scientists present public lectures and discussions to nearly 8 million visitors every year at about 250,000 events. UNANIA reports new findings and discoveries from all scientific disciplines.
- Being an organization of scientists, engineers, economists and innovators, the Chamber of Technology offers its members manifold opportunities for advanced professional training. The sections of the Chamber of Technology in the enterprises and groups organize regular meetings, discussions and courses devoted to current problems.
- The educational programmes of university television are broadcast by the GDR Television Service for industry and agriculture. They are instrumental in furthering vocational education, and are directly connected with continuing-education events organized in enterprises, groups, and agricultural cooperatives.
- The Women's Academy sees its special task in preparing housewives who have had to stop working, to take care of young children or for some other reason, for re-entry into working life. These institutions, run by the GDR's women's association, also disseminate pediatric information and announce production or educative activities which can be undertaken during the day.

(d) Postgraduate studies

The Integrated Socialist Education System Act of 1965 formulates the principle of the complementarity of training and advanced education as follows: "University and technical school graduates are obliged to acquire the knowledge and experience needed for their work, and to continue education

permanently." Since then, postgraduate education has become an important aspect of this country's system of higher education. "... Postgraduate education as an independent feature in the institutions of higher learning is one of the outstanding developments of the 1970s. To achieve productive division of labour among educational facilities they centre notably on educational levels which presuppose a systematic study of certain fields of science on a high theoretical level, and the rapid application in practice of the latest findings of research." (GDR, 1980d, p.67).

However, the increase in postgraduate education is not a matter of volume alone. New interrelations between pre- and postgraduate education "mean, for instance, that it is necessary to determine which objectives must be attained by undergraduate and which by postgraduate education. During the past few years we have begun to resolve this problem with a more exact definition of the guidelines for training." (GDR, 1970c, p.132).

(i) Functions and basic forms

Analyses, long-term scientific investigations and practical experiences show that postgraduate programmes for university and technical school graduates serve now, and will continue to serve, notably four functions:

- provision of special qualifications for functions and activities which are fulfilled or will be fulfilled by university and technical school graduates and for which no full-time or external studies exist;
- more thorough specialization in selected fields of science or interdisciplinary study of subjects pertaining to the requirements of changing work environments on the basis of the degreee of specialized education which has already been acquired;
- updating the knowledge and skills already acquired to keep up with the rapid progress of science and technology, in the particular branch of study or in relevant cross-sectional fields;
- communication of the latest findings of research to selected groups of specialists and innovators in the national economy to directly enrich their efforts and quickly apply research results to practice.

It is traditionally the highly qualified specialists (theorists and practicians) of the particular or affiliated fields of science who attend scientific events at institutions of higher education. The object of such events is to provide

and exchange the latest scientific knowledge in special, usually limited fields.

Full-length and crash courses are organized in selected fields or on special topics. Their number as well as the number of differentiated subjects is increasing. They have proved appropriate because they are an effective means of disseminating recent scientific findings, and they facilitate flexibility in response to changes in science and technology. The majority of courses are segments of full-time study programmes, and comprise up to 150 lessons. It goes without saying that enterprises and institutions grant temporary paid release to persons attending postgraduate study courses. This leave is provided for by law.

Postgraduate study courses facilitate the systematic acquisition of basic and specialized knowledge in selected fields. They cover several terms, have all the features of a high-level study course which raises the qualification levels of the participants in their professions, specialist fields and functions, and may lead either to certification or to a higher level of qualification without changing the degree acquired. Postgraduate study courses are usually external, and involve seminars, practical training and laboratory work. To fill the requirements of the field, a form of combined study has developed which is marked by a number of economic and educational advantages.

The work which the students must do alone is facilitated by study guidance notes, recommended reading lists and special teaching materials. Table 35 is a sample schedule of a postgraduate course.

The whole range of postgraduate study courses is contained in a catalogue published by the Ministry of Higher and Technical Education, which lists information concerning the long-term programme of events to be organized by universities, colleges and technical schools over a 5-year period. A supplement which is published annually gives information about current short-term courses.

(ii) Centres and complexes of further vocational education

An efficient organizational form of postgraduate education for scientific staff in industry, research institutions, universities and technical schools is represented by centres of continuing education which are attached to institutions of higher learning. They guarantee a rapid and reliable flow of information between academics and the field, and effectively encourage creative activity.

Table 35
Schedule of the postgraduate study course in "Design of micro-electronic switching circuits" private study (Sst); educational events in the form of lectures, seminars, exercises (LV); laboratory training (PK) in hours; examinations (P); final examinations (A); assigned papers (B)

No.	Subject	Total			1st term				2nd term				3rd term				4th term			
		Sst	LV	PK	Sst	LV	PK	P	Sst	LV	PK	P	Sst	LV	PK	P	Sst	LV	PK	P
1.	Selected problems of Marxism-Leninism	40	12	-	6	2	-	-	14	4	-	-	14	4	-	-	6	2	-	-
2.	Semiconductor and micro-electronics	250	101	24	65	31	-	-	135	50	24	-	20	8	-	-	30	12	-	B
3.	Circuits	110	64	-	35	20	-	-	35	20	-	-	20	12	-	-	20	12	-	B
4.	Microprocessors	180	44	4	-	-	-	-	-	10	-	-	90	20	-	-	90	14	4	A
5.	Fundamentals of the computer-supported design of circuits	320	170	-	70	32	-	-	710	74	-	-	100	56	-	-	40	8	-	A
	Defence of the final papers		20															20		A
	Beginning/completion of the study courses		20			4				6					4				6	
	Total hours	900	431	28	176	89			294	164	24		244	104			186	74	4	
	Exemption from work for - LV,PK and A (in days)	72			13				30				17				12			
	- final paper																4 weeks			

Source: GDR, 1980c, p.137.

Quite recently, encouraged by the state, continuing education "complexes" have developed in certain fields which are of special importance to the economy - for instance, powereconomy, automation engineering, and micro-electronics. These complexes are intended to further the education of qualified staff. Leading scientists and practicians disseminate the comprehensive knowledge needed to master the techniques, technologies and processes which determine levels of production, and provide information on their social and sociological consequences.

The Ministry of Higher and Technical Education was responsible for the establishment of the advanced education complex for micro-electronics. It co-ordinates the various elements of the complex in terms of their content and organizational forms, which are set by the various educational facilities. This complex includes at present 15 universities and colleges, three engineering institutes, several county organizations and special commissions of the Chamber of Technology, and selected institutes attached to the Academy of Science.

Advanced education complexes include not only long-term activities, for instance postgraduate study courses, but also events of short duration, such as seminars on specific problems, scientific meetings, short courses and various forms of job-related training.

(iii) Advanced education of selected staff

Clearly defined opportunities for advanced education are offered to certain groups of personnel. Objectives, contents and forms have been laid down in legally binding form.(1)

A uniform system of advanced education for managerial personnel in government and industry is provided at enterprise-run facilities, institutions in the economic sector, and facilities of higher education. After consultation with the various Ministries, some universities and colleges organize advanced courses for managerial staff at institutes for socialist business management. Special institutions at selected colleges, the so-called industrial institutes, prepare outstanding workers, innovators, specialists in rationalization, and supervisory workers for posts of leadership. There are also special systems of advanced education for educators, teachers and physicians.

Having concluded their study and been licensed to practice, physicians must continue their medical education and

(1) Cf. in this connection GDR, 1980c, p.135 et seq.

qualify as medical or dental specialists. This degree takes four to five years to acquire. It begins with a clinical year of employment in surgery and internal medicine; most candidates do this work while professionally employed. The degree alsoinvolves attendance at classes, courses and other educational events in university hospitals, medical academies, public hospitals and other medical institutions, and ends with a specialist's examination. Further specialization in a particular branch or affiliated field is also possible, subject to legal provisions. Medical specialists may be offered function-related specializations or qualifications in another field. Finally, all physicians must take annual advanced classes aimed at keeping them informed on latest developments. The Academy for Postgraduate Medical Studies is the scientific, organizational and methodological centre for the advanced education of physicians.

Special attention is devoted nowadays to the in-service education of the more than 168,000 teachers in this country. It is based on a standard programme, and courses are compulsory; it serves to increase knowledge and skills in political and social sciences, ideology, teaching methods, psychology, and the teachers' special branches of study, in which special courses are offered. Universities and colleges organize a remarkable number of such courses. Other institutions where in-service teacher education is provided are the pedagogical centres of the municipal and rural districts, which act as consultation centres and can rely on a staff of qualified teachers, and advisers for specializing teachers. The organization responsible for the content and subjects of in-service courses is the Central Institute of In-Service Education for Teachers and Educators.

(iv) Development problems

Under conditions of rapid social and technological change, the advanced vocational instruction of working people, particularly of members of the scientific and technological intelligentsia, gains increasingly in importance. This is why institutions of higher education devote so much attention to it. "In accordance with each university's capacities, and with economic constraints, the range of postgraduate studies must be enlarged and defined. It is imperative to organize still more courses and seminars in close co-operation with the enterprises, groups and scientific societies, and to use them more efficiently to introduce the latest research developments into social practice. In conjunction with the competent Ministries we must assign special attention to labour and to the further development of the institutes for socialist

business management, the industrial institutes, and the continuing education centres as priority fields in the national economy." (Socialist Unity Party of Germany, 1980,p.375).At the 5th Conference on Higher Education the first successes in the solution of these problems were already obvious, for example in the field of micro-electronics, which is vital to further economic development. (See GDR, 1980d) The College of Technology at Karl-Marx-Stadt (See GDR, 1980d) tackled the task by expanding an advanced-education centre and developing an advanced-education complex for "Micro-electronics". This complex has familiarized more than 10,000 people working in industry, research and development, and higher education with new findings in the development and application of micro-electronics since 1979.

A council of experts, composed of scientists in higher education, the Academy of Sciences, and the Chamber of Technology, has defined the strategic aims and most efficient forms of advanced vocational education in the field of micro-electronics for the years 1981-1985. The programme elaborated comprises a broad range of facets of continuing education, from postgraduate studies to job-related training in the enterprises. The main objective consists in laying an even more effective scientific groundwork for the development and application of micro-electronics and in responding readily to the various needs of advanced education.

Analytical investigations justify conclusions which may be generalized and outlined as follows:

- Short-term measures of advanced education tend to increase because scientific and practice-related training at the institutions of higher education is now of higher quality.
- Highly dynamic fields of science, with integrated elements and eminent importance for the national economy are given priority within the system of advanced vocational education.
- Advanced education is provided especially at those colleges and universities which are centres of research and development in the relevant fields and play a significant role in the introduction of new findings into practice.
- Advanced education means not only the provision and exchange of information but also the utilization of capacities.
- Of particular importance is job-related education in the enterprises, for which the educational facilities of the enterprise and university teachers bear joint responsibility. It provides the most direct feedback between advanced education and training.
- In this matter the immediate advanced education of young graduates is most significant. It is provided by colleges and universities as well as by the enterprises, and begins right after the graduates' employment.

The example of micro-electronics demonstrates that these efforts on the part of the institutions of higher learning have contributed to making the GDSR one of the few countries in the world "which in important spheres enjoy a potential that puts them in a position to develop and produce micro-electronic components, manufacture selected sub-assemblies and produce the sophisticated equipment for such processes." Whereas in 1976 the GDR produced only a narrow range of micro-electronic components, valued at several million marks, production amounted to nearly one thousand million marks by 1980. The 1980 production of highly integrated circuits will be trebled by 1985; the number of basic techniques, which is now 8, will be increased to 15 or 17 within the next five years.(See Socialist Unity Party of Germany, 1981b, p.37-8).

We do not want to conceal the fact, however, that there are significant reserves still to be tapped. It is of fundamental importance for the GDR, which is poor in raw materials, and therefore dependent on science-intensive production, to make the best possible use of university and technical-school graduates. "In future the advanced training of graduates of universities and technical-training institutes will assume a position similar to that of the regular training offered at these institutions. It must be organized in such a way that it forms a continuation of the regular course, takes into account the differentiated and challenging demands arising from the jobs of these graduates, and guarantees the immediate introduction of research findings into practice." The principal of the College of Technology at Karl-Marx-Stadt stated: "The attitude toward advanced education cannot be one of isolation; it is an expression of the attitude toward learning in general. Those partners in industry who think there is no time left for advanced education are always the very ones who have to struggle with great difficulties regarding the quality of their products, innovations, and plan fulfilment in general." (GDR, 1980d,p.168).

Analyses and scientific studies prove that university and technical-school graduates who participate in advanced education courses are capable of much better performance in their work. The drop-out rate among postgraduate students is low; given the participants' consolidated motivations, it is not surprising that their results are particularly satisfactory. On being asked why they attended various postgraduate study courses at the "Bruno Leuschner" College of Economics in Berlin, participants gave the following reasons:

- to keep abreast of the rapid development of science and technology (73 per cent of the interviewees)
- to acquire the subject-specific knowledge and abilities needed for their jobs (72 per cent)

- because they strongly desire an occupation involving theoretical problems (63 per cent) (GDR, 1981s, p.26)

Within the scope of the long-term programme of further extending the network of postgraduate study courses and broadening the selection of studies offered, the institutions of higher education concentrate mainly on the following issues (GDR, 1980c, p.143 et seq.):

- to give priority to the provision of more postgraduate opportunities to persons in key fields of science or key positions in the practical application of scientific and technological progress. Continuing education of scientific and technological staff, engineers, and economists is deemed to be particularly important.
- the studies offered shall be more varied (long- and short-term courses) in the interests of flexible response to various and changing demands;
- to transfer the experience gained in advanced education centres and complexes to other fields of endeavour;
- to use more efficiently the potentials inherent in postgraduate education, with the aim of rapidly distributing the latest scientific findings and applying research results to practice;
- to improve the methodological and didactic arrangement of lectures and the planning of their contents.
- to extend quantitatively the facilities offering postgraduate education.

Some 50,000 university and college graduates and more than 117,000 technical-school graduates participated in advanced vocational education events in 1979. That is to say, about 10 per cent of the university and college graduates and some 14 per cent of the technical-school graduates now employed in the national economy have done postgraduate work.

III. Education and employment planning

This section will summarize the major elements of the system of planning of education and employment. In so doing it will be necessary to return to some of the points made in sections I and II, since the individual issues, for logical reasons, are preliminarily treated in those sections. Section 1 emphasized the fact that there are a host of interrelations between the planning of the national economy as a whole and the planning of education and employment. The following is a concise description of some of these interrelations and their importance to the planning process.

The planning of education and employment in the GDR is part of the overall national economic planning, which has been harmonized and balanced with the other plan components (see Hinze et al, 1980). This fact helps to explain its dynamic and continual development, along with the indisputable fact that education and employment can be planned under socialist conditions.

References to planning in the following and all other sections of this study assume a synthesis between management and planning, so that planning is to be understood as one of the most important functions of management.

A. Fundamental information

1. Targets of planning

With the emphasis on basic and advanced vocational training the main task of educational planning is to develop qualification and occupation structures geared to the demands

of national economic advance, and a high level of general education in the people, their individual interests, inclinations and needs being taken duly into account. This fundamental task cannot be separated from that of computing the number of people employed (manpower planning). The social labour potential is used efficiently only if both the number of the working people and their qualification and occupation structures largely correspond to the actual and long-term requirements of the workplaces in the various branches of the national economy. The manpower requirement, broken down by quantity and qualification, in turn, exercises furdamental influence on the educational measures to be planned in advance.

The harmonization of education with employment which is envisaged is a decisive prerequisite for the development of the major aspects and characteristics of a personality. In addition to the enhanced utilization of the educational potential, which will boost the efficiency of the national economy, this concomitance assures conditions that are essential for the working people to use their qualification and to be creative and active.

Planning is used solely as a stepping-stone. In the special case we deal with here, it means the realization of those fundamental objectives of education and employment outlined in sections I and II. There is no special objective to be attained by planning in this area, but if they are to be planned, a number of implications emerge for some of the fundamental objectives. This is true in particular of safeguarding equal rights to education and to work.

One major issue is the definition of an equal right to education which is adequate to socialist conditions. It comprises the right to general education, which is acquired by all members of society and constitutes the basic prerequisite for their life and work in society, and includes as well the right to specialized education based upon general education and directed towards preparing for and practising a vocation.

It is one of the well-known merits of socialism that it has created the conditions necessary to guarantee equal opportunities for a well-rounded education to all members of society, and to do away with educational privilege. With a socialist approach, both general and specialized or vocational education are education in essence, from which a well-rounded personality develops. This line separates us from theories viewing only general education as education, and assigning vocational education to an allegedly inferior sphere-the sphere of so-called training (see Neuner, 1972, p.26 et seq.). Thus planning aims at an implementation of the equal right to education in the broader sense mentioned above. But it will be recognized that the right to vocational training can be

implemented only if national economic requirements are taken into account, and this is one of the major problems encountered during planning.

All young people in our country are guaranteed training, but admissions largely depend upon national economic requirements and possibilities. If the planning authorities fail to take them into account, disproportions between the qualification and occupation structures of the social labour system may result. Specialized training which the trainee cannot apply to a job will involve financial losses and result in social and moral setbacks.

In order to provide training for all young people planning determines (in particular by means of balancing) actual requirements. State management and planning authorities see that the required number of training places are available. But an optimum correlation between demand and provision of training assignments is something which cannot be achieved solely with the means and methods available to planning personnel, which must be supplemented through measures such as career information, counselling, and guidance, as described in section II(B). It is also necessary to apply certain educational and political principles in selecting the applicants for the next stage of education.

This conception of equal rights to education involves another consideration, which is related to the quality of the implementation of the right to work: the right to training must be supplemented by the right to an appropriate job.

On the assumption that the right to work is one of the fundamental human rights, full employment has always been at the forefront of the policies of our country. In the GDR, full employment was reached as early as the beginning of the fifties. The present challenge, however, is not restricted to that fundamental task of securing employment for all people, but rather to giving all people jobs which are in line with their training, capabilities, inclinations and interests. It is quite natural that this new quality of the right to work can be implemented only on a long-term basis, with new problems likely to arise.

As a consequence, planners of education and employment must take into account the ever closer interrelations between the trends in development in the qualification and occupation structures and those in the workplace structures. The latter should not be understood as resulting solely from technical development, but has, rather, to be consciously influenced if qualification and workplace structures are to agree to an increasing extent; thus the planning of education and employment will have to meet requirements in both the quantitative development of the workplaces and their qualitative structures.

2. The dynamics of education and employment

The dynamics of education and employment in our society oblige planners in this field to face new tasks and problems constantly. Three major factors will determine these dynamics decisively in the 1980s(1).

1) The acceleration of scientific and technological progress and a broad utilization of its results in all branches of the national economy will be the decisive keys to greatereffectiveness of the qualitative factors of economic growth. It is becoming increasingly important to improve economic efficiency through the utilization of modern science (Socialist Unity Party of Germany, 1981b, p.62).

Planners of education and employment are consequently faced with two problems. On the one hand, a broad utilization of the findings of modern science in all branches of the national economy and of society will result in further differentiation in the use of the social labour potential, which, since it constitutes the basis on which the qualification and occupation structures are planned, must be anticipated far in advance of its actual use. On the other hand, the release of workers from certain jobs gives rise to the new and ever more important task of persuading people to go into new jobs and of preparing them for their jobs. That is why manpower requirements must be met by means of transfer and advanced training of workers, which must be more effectively included in the planning and balancing of manpower needs.

2) According to socialist concepts, the education and qualification levels of all working people will continue to rise in the years to come. In the interests of attaining the high performance and efficiency targets set for the national economy, the question of how to transform the high educational level attained into economic and social performance is increasingly gaining in importance. The issue at stake for education and employment planning and management is thus the problem of the utilization of the existing educational potential.

3) The needs-both material and cultural-of the working people will continue to rise along certain development patterns, and so will the demand for a job in which the worker can fully develop his knowledge and skills. Thus it will be necessary

- to discuss with the working people all measures to be taken in the field of education and employment;

(1) Cf. sections C. and D. below

- to take job content more consciously into account in designing the layout of workplaces;
- to upgrade career and study counselling in order to persuade young people to enter training or courses of study which are in line with national economic requirements (Socialist Unity Party of Germany, 1981a, p.29).

3. Long-term planning

The dynamics of the trend in education and employment places heavy demands on the overall management and planning of the reproduction of the labour potential. The problem of the relationship between short- and medium-term planning and long-term forecasting is particularly acute in this field, where the problems involved have a largely long-term character. One is that changes in the qualification structures can be achieved only over long periods of time-a fact which is due to conditions inherent in the educational process. A high quality of education, in turn, presupposes a high degree of continuity.

Abrupt changes in the training structures are very difficult to bring about because of the complex social conditions which surround, especially, vocational training, and because of the long-term character of the educational process itself. Short- and medium-term plans for the development of the national economy cannot constitute the basis on which educational efforts and the necessary conditions in terms of personnel and materials are determined in advance. The quality of planning of education and employment is decisively dependent upon a long-term forecast of the social manpower needs with regard to their quantitative and qualitative structures and on society's demand for graduates from the educational system.

The planning of education and labour as two complexes is embedded in the interrelations between scientific, technological, economic and social development processes and intellectual and cultural development processes, which intensify as the socialist society develops. Planners of education and employment must take careful account of this on a long-term basis, because lapses today will result many years later in national economic disproportions which may be extremely difficult to correct.

In realizing the economic and social goals of education and employment planners are faced with the task of creating on a long-term basis a ratio between education and the process of reproduction of the national economy which will allow full development of the economic potential of education and well-rounded personality development in line with the economic

level attained by society at the given historic stage. (see Korn and Maier, 1977, p.15 et seq.).

B. The planning principle

The principle on which a socialist state is based is called democratic centralism.(1) This means the linkage in a planned economy of centralized government management and planning to the creative activity of the working people, the enterprises, and local government bodies, which they undertake on their own account. In the report of the Central Committee of the SED to the 10th SED Congress Erich Honecker, General Secretary of the Central Committee of the Socialist Unity Party of Germany and Chairman of the State Council of the GDR, stressed: "For us it is an established principle that the teams in production and elsewhere discuss the annual plan targets in detail. All major projects ... are discussed with the trade union representatives on the shop floor. The trade unions will continue to have their say on many aspects of the plan, in line with rights guaranteed them by law ..." (Socialist Unity Party of Germany, 1981b, p.104).

1. The process of plan drafting

Democratic centralism is also reflected in the process of plan drafting, which comprises four stages. In the initial stage, economic statistics are computed, on which the future plan is based, that is to say, on which the centralized plan project will be drafted. The planning body, with the participation of other centralized government bodies and county

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(1) This principle is characterized by the following major features:
- eligibility of the popular representative bodies for election to the state governing organs by all citizens;
- accountability of all managing bodies to the popular representative bodies and of the representatives of the people to their electors;
- unified management of economy and all spheres of social life through a central body;
- comprehensive participation of the citizens in official affairs at all levels;
- top-to-bottom binding force of all laws and decisions.

planning organs, works out the plans. To ensure balance, the following figures are computed:

- population, working population and manpower reserves,
- the number of school-leavers and their distribution on individual educational lines.
- the number of graduates at the various levels, and their distribution in the branches of the national economy and regions of the country.

Taking the results of the project plans and economic and educational objectives into account, the centralized planning body, on behalf of the Council of Ministers, provides other centralized government bodies (Ministries, for example) and the counties, with guiding indices and government-issued targets. The guiding indices are of an informative character, but the government-issued targets are set by the centralized planning body and constitute binding indices determined by the Council of Ministers. The centralized government bodies and county authorities break these indices down and assign them to the districts or bodies, enterprises and institutions under their jurisdiction. The targets constitute the basis on which the draft plans will be drawn up.

The plan is discussed in detail by the working people and social bodies, and then during the second stage the plans are drafted by the enterprises, institutions, and economic and government bodies, in constant co-ordination with the competent regional planning body. It is necessary, for example, to co-ordinate an enterprise's plan for staff replacement and additional employees with the regional distribution of the resident population, the working population and manpower reserves, and the number of school-leavers and their distribution along the various educational lines.

At the third stage, the draft plans are defended before the superior planning body, to harmonize the ideas conceived at the various planning levels (enterprises, economic branches, districts, counties, etc.) with national economic considerations, to make sure the draft plans agree with actual requirements and to find the solution which is most efficient in terms of the national economy.

The fourth stage involves overall national economic balancing, the completion of the national economic plan, and its adoption by the legislature which passes the laws pertaining to the five-year and annual economic plans.

On the basis of these laws, government plan targets are set and classified from top to bottom. The regional planning authorities are informed of the government plan targets assigned to the enterprises in the region they are in charge of. These plan targets are binding requirements, derived from the economic plan adopted, and published in the form of plan

indicators or norms. They constitute the basis on which the plans at all levels are completed, and the regional popular representative body adopts the plans for each region. Plan fulfilment is gauged by the government plan targets. The government and economic bodies as well as the enterprises and institutions must report on their fulfilment.

2. The role of enterprises and regional bodies

Enterprises and regional bodies must play a major part in the implementation of the principle of democratic centralism. Centralized planning and management of the national economy and of all other spheres of society gives them a special significance in the process of implementation of the fundamental objectives of the planning of education and employment, because it is up to them to translate those objectives into practice.

The social labour potential is largely restricted in terms of regional distribution. The basic fact is that a certain population, defined as to number and structure, is resident in a given region (county or district), and constitutes the available labour potential. The enterprises and institutions located in that area must meet their manpower needs primarily from that population. This is why in all regions of the country, assessments must reflect the correlation between the available and the required labour force, between available workers and existing jobs, between the training opportunities required and those offered, between the number and the distribution of graduates from the educational facilities, and the degree to which the jobs offered them are in line with the training they have received.

These assessments, however, do not deal individually with training opportunities or jobs, but with social processes; thus the assessments cannot be made once and for all for each plan. Greater flexibility is needed, i.e. continuous reassessment of the above-mentioned elements, checking to be sure that the basic aims and new information are taken into account in the decision-making process. Up-to-date assessments are the only means of ensuring prompt responses to new requirements.

Co-operation between the local government bodies and enterprises is of particular importance in the process of regional balancing of education and employment. This kind of cooperation guarantees that regional imbalances between training places offered and those in demand, as well as regional differences in the number of graduates at the various levels in the educational system, can be corrected and brought into line with an optimum utilization of the social labour

potential. The local government bodies must see to it that the manpower plan for their regions is adequately supported in housing construction, transportation, the educational system, the health care system, supply of goods, and other sectors. The state planning bodies in the GDR's counties and districts constitute the authority for balancing and managing the social labour potential.

In accordance with the fundamental goals of planning and national economic requirements and possibilities, planning means and methods provide the necessary structures for ensuring training opportunities or jobs geared to the needs of graduates and other young people. The plan, however, can be implemented only if the people fully understand it, and if their interests and needs are duly considered. The constitution of this country guarantees to all people the right to freely choose their training and their jobs.

The regional bodies and enterprises have a decisive role to play in efforts to reconcile social needs and possibilities, as reflected in the plan, with the interests and needs of individuals.

3. Harmony between individual and social interests

The unilateral orientation of planning towards the interests, inclinations and needs of individuals in accordance with the stage of education they have completed does not in itself guarantee harmony between education and employment. Nor would it guarantee occupation and qualification structures which would satisfy national economic requirements. The right to a job which is in accordance with the level of qualification can be implemented only if the greatest harmony possible has been established between the individual's interests, inclinations and needs and those of the society.

Planners of education and employment are constantly faced with the particularly complex problem of reconciling young people's inclinations and interests with the social possibilities and needs, at each stage in their progress-choosing a field of study, entering a new field of education, or finding a job. Many young people, their parents and teachers are concerned with this problem. Although, in 1978 in the GDR, almost 80 per cent of the young people leaving general schools were admitted to training for the job they desired, the problem cannot be regarded as solved. Constant efforts on the part of the government bodies, enterprises and the young people, their parents and teachers are needed to overcome new problems and to find the optimum solution in each case for the harmony of personal desires with social possibilities.

In an effort to find a solution to the problem, the GDR introduced a comprehensive system of career and study guidance and counselling, and recruiting schemes for graduates from the educational system. The regional authorities and the enterprises are directly responsible for the implementation and the efficiency of the system.(1).

C. Manpower planning and planning of the educational system

These two systems constitute relatively self-contained and complex sub-systems within the framework of overall planning in socialism. Each has its own specific character, and many interrelations exist between them.

1. Educational planning

Educational planning is an aspect of the educational policies pursued; it serves in the implementation of the educational objectives outlined in sections 1 and 2, which are based on a conception of man as a well-rounded, developed personality, and the main productive force of society. Education must therefore be planned in two major directions. The first is its internal objectives, contents, methods and organizational forms. The second is its relationships with economic growth. For the specific case we deal with, this means planning the performance of the educational system in terms of the number of persons to be trained or further educated, and of the number of graduates from each level of education, in view of the scope and structuring of national economic manpower requirements. This second aspect includes the development of the material and financial conditions of the education system, and the personnel working in education.

Constituting an inseparable synthesis, these two aspects determine the character of socialist planning of education(2). Hence, in spite of the close interrelationship between manpower and educational planning, the educational system cannot be

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(1) See section II(B) above.

(2) The GDR's educational system offers social benefits such as free education, free school books, grants, school meals, accommodation of students and apprentices in students' homes and hostels, etc.

derived solely from the manpower needs of the national economy.

We see that the planning of education in the GDR is complex, and only its most important aspects can be treated here.

Planning of the educational process is implemented, as one fundamental form, in pre-school and general education, in documents for the training of skilled workers, and in the programme for university, college and technical-school students. These are legally binding state plans which determine and match the objectives with the content of courses conducted at the above-mentioned educational facilities.

Another fundamental form of educational planning is applied within the framework of the planning of the national economy of the GDR. The five-year and annual plans for the development of the national economy contain sections dealing with education, so that all major factors in the development of education (personnel, investments needed, training capacities, number of graduates, etc.) form part of the overall national economic assessments, through which the material means for their implementation is ensured. We call this form of planning "national economic planning of education", because it links the planning of the educational process with economic requirements and possibilities. It starts out from educational objectives resulting from the long-term tasks for the educational system, namely the growing educational needs and trends in the manpower needs of the economy. It takes into account the means available for the implementation of the educational objectives, which depend upon the overall development of the national economy.

The planning of educational research is another facet of educational planning which is closely interlaced with all the other forms. This planning is also conducted in five-year and annual segments. The function of such planning is twofold: to investigate possibilities of raising the quality and efficiency of the educational process, and to lay the scientific groundwork for future development in education.

The direct linkage of national economic planning in general with the planning of the social labour potential in particular is largely quantitative, involving the number of persons undergoing initial or advanced training or the number of graduates at the various levels in the educational system. On the basis of the demand for these graduates and trainees, and in view of the demographic situation, the planners of educational supply define the extent and structure of the training of the social labour potential.

The levels to be planned are arranged in an order which must be respected by all planning authorities. Applying the so-called planning pyramid, in accordance with the principle of

democratic centralism, only a few factors which are of decisive importance to proportional development are planned at the centralized level, the lower, wider ranges on the pyramid at the local level.

Fig. 7 is a schema of the groups involved in educational planning in the GDR. It is an attempt to show the interrelations between the individual groups and the whole structure of manpower planning. Certain specific details in the GDR's education system have been omitted for the sake of clarity.

The educational system is a system of educational paths, which one may choose with the assurance of finding a demand in the society, and follow according to one's abilities. A systematic formulation of the various paths in the subdivided overall system is, in the final analysis, identical to the formulated contents of the reproduction of the social labour potential. The role of national economic planning in the various spheres of the educational system is to guarantee that the proportions between the various stages of education and its objectives and content match the current and projected demand of society for manpower of varied qualifications. A corollary duty is to harmonize personal and social needs to the greatest possible extent, and to gear the capacities of all types of education to the needs of the social process of reproduction. The problem is to guarantee training opportunities to all school-leavers, and to proportion the number of training opportunities at the various levels so that the long-term national economic demand for manpower will be satisfied.

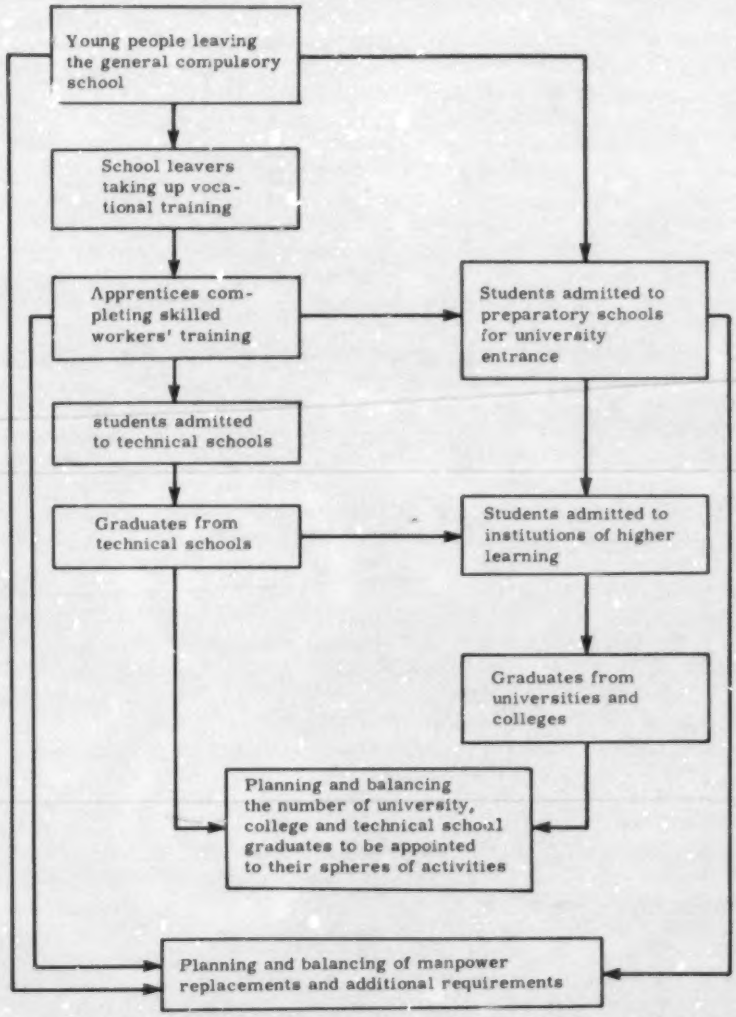
2. Manpower planning

Another part of overall national economic planning, manpower planning, aims at full employment and the rational use of the social labour potential. It is the most important tool at the disposal of the state for guaranteeing to each citizen the constitutional right to work. In addition to this fundamental objective, manpower planning serves

- to promote the personal development of the individual by advancing the educational levels in accordance with the needs of the occupation and qualification structures;
- to ensure the efficient employment of the workforce;
- to fulfil the targets and optimize the productivity of labour.

Manpower planning is based on the demographic determination of the manpower potential. The manpower available varies largely with the age and sex distribution of the population and the changes it undergoes. The development

Fig. 7 - Relationships between educational planning and manpower planning


Young people leaving the general compulsory school
School leavers taking up vocational training
Apprentices completing skilled workers' training
Students admitted to preparatory schools for university entrance
students admitted to technical schools
Graduates from technical schools
Students admitted to institutions of higher learning
Graduates from universities and colleges
Planning and balancing the number of university, college and technical school graduates to be appointed to their spheres of activities
Planning and balancing of manpower replacements and additional requirements

year or the (five-year) plan period. The main principle underlying this process is that the planners must work with data pertaining to school-leavers and graduates at the various levels of education, who constitute the main source of manpower for replacement and additional staff requirements. As stated in section 1, the GDR has almost no other sources.

and structure of the population is projected for a given period and computations made of those sections which will be economically active, so that an accurate ratio can be forecast, and the frame set for its employment. Balances correlating the population as a whole, the working population, and the manpower reserves are drawn up, both at the centralized level and in the various regions of the country.

The main function of manpower planning here is to meet the manpower needs as determined by national economic computations. The manpower needed is determined in respect of the number, level of qualification, and distribution of jobs and specialized fields. Since our planning is based on years, the initial step is to determine the actual manpower in the reference year and then to determine the required manpower for the plan year (or plan period) concerned, which must be equal to the manpower needs for that period.

The determination of needs is one of the most difficult functions in manpower planning, because it is influenced by a multitude of factors such as increases in labour productivity, development in the fields of science, technology and production, changes in the structure of the national economy, and distribution of the productive forces. Its results are of decisive importance to the planning of the output to be provided by in the educational system; they must cover a period of at least 15 to 20 years. Numerous international models and concepts have been put forward to resolve this problem, but, all things considered, satisfactory solutions have not yet been found. At present, the GDR primarily uses the following methods to determine its manpower requirements:

- the manning-table method to determine factory manpower needs within the framework of the annual plans;
- estimates on the basis of practical experience or technical documents on comparable projects;
- extrapolation to determine trend developments by means of computations or drawings;
- comparison of the manpower number and structure of one factory with that of others, in similar branches, which are considered optimum;
- correlation and regression analyses for selected manpower categories by means of a quantitative determination of the interrelations between a manpower category and the factors influencing it. On this section, research results were obtained in the GDR by Ludwig et al, 1972, p. 127 et seq.; Korn and Maier, 1977, Korn et al, 1973a, p.559 et seq. and 1973b.

The centralized and regional authorities draw up balances on replacement and additional staffing requirements in an effort to determine the labour requirements for the plan

D. Harmonization

In this section the focus is on those interrelations between educational and manpower planning which ensure unity and complementarity between education and employment, if systematic use is made of them. All the specific tasks and methods resulting from these interrelations are called the 'system of planning of education and employment.

1. Qualification structure and training requirements

Existing qualification and occupation structures must be accurately determined if a good correlation is to be reached between manpower planning and the planning of the educational system. The qualification and occupation structures are of major importance in assessing the educational needs and the functions to be fulfilled by the various divisions of the educational system. The kind of planning involved here is long-term. Needs for highly qualified workers must be determined far in advance, because the young people must be trained before they can be appointed in the various branches of the national economy. A system of specialized planning for graduates' appointment has been developed.

The process is highly complex. The five-year plan contains the target number of students to be admitted to university studies during a given five-year period, but they will graduate after it has ended. The five-year plan also contains the appointment scheme for graduates who have begun their studies in the preceding plan period. Consequently, the number and structure of those entering higher education establishments cannot be derived from the targets of the five-year plan in force. The planners have to anticipate the national economic development over a much longer time-scale.

Within the framework of a five-year-plan period the possibilities for responding to changes in manpower requirements at short notice are restricted in the institutions of higher learning or are costly in terms of both financial and human resources.

The development of the qualification and occupation structures must be planned in such a way as to ensure the proper timing of measures aimed at achieving a planned structure in the individual sectors of the educational system. The length of the period available for implementing those measures is primarily dependent upon the duration of training, the process of career guidance, career and study counselling, the training capacities available and the personnel to conduct the training. And periods vary with the various forms of education. In the GDR, a

period of 15 to 20 years is normally required to produce a university, college, or technical-school graduate, and about five years less to produce a skilled worker.

The problem of long-term changes in manpower demand and supply is aggravated by the problem of the immense theoretical content of modern education. Young people must be given the information, abilities and skills which will give them a command of science and technology reaching into the future. They must be provided with useful knowledge and skills, and must be in a position to acquire essential knowledge on their own initiative and to become versatile in their trades.

The specific features mentioned above indicate how securely manpower and educational plans have become interlocked. They show also that long-term decision-making is required of planners of the qualification and occupation structures, and that long-term planning in this field is of over-riding importance.

The centralized planning authorities, economic departments (specialized Ministries), the Ministries of education, and scientific institutions jointly work out long-term forecasts of the development of the occupation and qualification structures and the labour requirements at each level of education, and make them available to enterprises, institutions and regional government bodies as guiding material on which they can base the assessment of their training requirements.

Taking into account the data contained in the long-term forecasts, the enterprises draw up their own qualification structure and trainee requirement plans, which are part of the five-year plan.

At the outset these plans are working instruments for the enterprises and economic bodies to develop their own ideas on the development of manpower at all levels of qualification, and the probable training requirements. In terms of methodology, they correlate the manpower of the reference year with the graduates expected during the plan period from the educational establishments, and calculate the manpower wastage. The result is the potential qualification structure. The economic body co-ordinates these plans for all enterprises under its jurisdiction, after which the centralized planning body assesses the co-ordinated plan and integrates it into the overall balance of the national economy.

The following subplans in particular are used in the detailed planning of the qualification structure and training requirements:

- university, college and technical school graduates, and skilled workers by trade;
- provision of skilled training to school leavers;

- employment of university, college and technical school graduates.

Such subplans must balance in all their most important aspects. The data for planning the levels of graduates to be produced by the educational system are derived from such subplans. A short description of the subplans will be given hereunder.

2. Graduates and skilled workers by trade and by occupation

This kind of planning serves to develop a desired occupation structure, and at the same time it creates all the necessary prerequisites for long-term career orientation and counselling to meet the necessary social and political concerns. To encourage the systematic development of the occupation structure, the tried and tested principle of breaking down the planning complexes into the various levels of diploma is in use in the GDR.

The number of university, college and technical school graduates is centrally determined. The long-term plans contain the number of students to be admitted to university, the number of graduates and the functions to which they will be appointed, and the extent of development of the labour force. All data are classified in the individual five-year plans. The trend in the occupation structure is set on the basis of the branches of science and the groups of specialized subjects and fields. Figure 8 shows a matrix on which this type of breakdown can be made.

Long-term centralized planning of the number of skilled workers to be made available includes only the number of school leavers entering skilled training and the extent of development of the labour force. No breakdown by occupation is considered here. This becomes relevant when the enterprises, economic bodies and regional authorities draw up their five-year plans. The reason is that the enterprises are in a position to determine the occupation and qualification structures required for a five-year period fairly precisely, and to conduct the necessary training. This sort of planning of selected occupations by the enterprises is supplemented by planning selected occupations at the level of the economic bodies and regional authorities. The economic bodies plan those occupations which are specific to the industry concerned, so that adequate junior personnel is available for certain top priority projects. The regional authorities are primariy concerned with the planning of occupations in supplies and services specific to their regions, and with the development of the regional infrastructure.

Figure 8 - Model for Breakdown by occupation

Branch of national economy	Fields of study				
	Sciencee	Engineering	Economy	Law	Education
Industry					
Construction					
Transport					
Agriculture					
Commerce					
...					
Education					

Source: Korn and Maier, 1977, p.156.

3. Planning the number of school leavers to take up skilled training

This kind of planning stems from occupational planning and its supreme objective in the GDR is to guarantee vocational training to all school-leavers who do not go on to higher education. The jobs to which the school-leavers are assigned are planned within the framework of the five-year and annual plans. The initial step is taken by the centralized planning authority, which draws up an assignment estimate, broken down into economic branches and regions. This estimate forms the basis on which the regional authorities work out the plan for the assignment of the school leavers exclusively within their region.

These planning activities start with an "assessment" of the number of school-leavers eligible for skilled training, which computes the total number of school-leavers from the

general compulsory school and their distribution on the various paths of education and training. The number is then broken down according to the enterprises and other employing institutions in the region, with the underlying objective of establishing the optimum agreement between the planned trend in the occupation structure and the amount of manpower available. Migration of young people for training opportunities in other regions is also taken into account.

Planning covers a period one year ahead of actual requirements in order to allow for career guidance and the conclusion of deeds of apprenticeship between the young people and the enterprises.

4. Assignment planning for graduates

This type of planning is done within the five-year and annual planning schemes by adapting the long-range forecasts and estimates of requirements for university, college and technical-school graduates in the various branches of the economy. As has been mentioned, the distribution of graduates among the specialized subjects is known for the given five-year period, because they have been training since the beginning of the planning period.

The centralized planning authorities work out "assessments of the assignments of university, college and technical-school graduates" within the five-year plan. These assessments contain the information required by the centralized and regional government authorities concerning the planned workplaces for the graduates, and the authorities break down the number of graduates by enterprise or institution, taking into account the demand as shown in their qualification structure and training requirement plans.

5. Balancing as the main planning concern

The findings from the forecasts, long-term plans, output and efficiency computations, etc. are translated into actual five-year and annual plans by several means, the most important of which is balancing, which is of overriding significance to the determination of proportions within the overall plans and subplans. Balancing is based on certain principles, the most important of which will be described in this section.

Conscious balancing involves constantly reviewing the basic data and including new findings so that planning can be continuously improved. Balancing in the field of education and employment calls for a high degree of synthesis between overall national economic and regional balancing, as well as a close collaboration between the regional authorities and the

enterprises and other institutions in the area. Centralized computations must be verified by regional findings concerning population trends, etc., and regional computations must take into account the results of centralized forecasts and long-term estimates and plans. All regional balancing, through collaboration between the regional authorities and the enterprises should aim to assess objectively the manpower available in that region according to specific versatility and mobility characteristics. The regionally varying opportunities for vocational training, efforts toward the employment of women, and other factors must be brought into harmony with an optimum utilization of the social labour potential.

Mention must be made in this context of the fact that cross-checking between the individual parts of the balancing process must provide clear results, since the inter-relations between them must be revealed and taken into account.

Figure 9 is an attempt to show this synthesis of planning and balancing in the field of education and employment.

Figures 10 and 11 exemplify two general assessments in the field of education and employment.

Figure 9 - Relationships between the planning and balancing of education and employment

Planning of the development and utilization of the social labour potential	Planning of the qualification & occupation structures	Planning of the assignment of school-leavers and graduates
Assessment of resident population, working people and manpower reserves	Assessment of qualification structures and training requirements	Assessment of the number of school-leavers and their distribution
Assessment of replacement and additional staffing requirements		Assessment of university, college and technical-school graduates to be assigned

Figure 10

Assessment of the number of school-leavers and their distribution

School-leavers	after the 10th year	after the 8th year	before the 8th year
Total/female	Total/female	Total/female	Total/female
Number			
1. Number of school-leavers in the district/county			
2. Additional school-leavers coming from other districts/counties			
3. School-leavers migrating to other districts/counties			
4. Total number (1. + 2. - 3.)			
Distribution			
5. Pupils entering the "Abitur" division			
6. Pupils entering technical schools			
7. School-leavers who do not take up training or work			
8. Number of school-leavers who will receive skilled training (4. -5.-6.-7.)			

Figure 11 - Assessment of the qualification structure and training requirements

Indicators	Economically active manpower as of 31/12/1975 absolute figure	%	Required manpower size as of 31/12/1980	Wastage total	Wastage attrition	Wastage other wastage	Additions 1976-1980 total	Additions 1976-1980 university, college and technical-school graduates	Additions 1976-1980 others	Potential manpower size as of 31/12/1980 absolute figure	%
Qualification structures											
Total manpower size											
Females											
University and college graduates											
Technical-school graduates											
Foremen											
Skilled workers											
Females											
Unskilled workers											
Occupation structures											
Selected specialized fields and groups of occupations, or occupations											

6. Planning authorities

Development in the field of education and employment, as in all other social fields, is planned and guided by the State in the GDR. State planning comprises the scope and structure of the levels to be attained in the educational system, research at universities and colleges, the development of the conditions for those employed in the field of education, and the planning and balancing of the workforce of all social and economic spheres.

The planning levels can be broken down into centralized, regional and enterprise planning. The Council of Ministers of the GDR is in charge of centralized State planning. It makes decisions on all fundamental questions and regulates responsibilities.

The State Planning Commission is the centralized planning authority of the GDR, integrating the planning of education and employment into the planning of the national economic reproduction process. Working in close co-operation with the economic and educational Ministries, this Commission is in charge of planning and developing educational potentials in line with national economic requirements, and of planning the qualification structures involved in the process. On the basis of economic structural policies, it determines the number and qualifications of the working people required by the individual branches, spheres and regions, and includes the tasks necessary to obtain the data in the Directive for the five-year and annual plans.

The planning authorities of the regions (county and district bodies) assess the number of school leavers eligible for vocational training on the basis of the decisions taken on a national economic scale. They plan and assess the trends in the resident population, the working people and the manpower reserves for their regions. They help the enterprises create training facilities with a view to ensuring high quality and efficiency in the skilled training in their regions, and the rational use of their training capacities.

Planning at the level of the enterprises is characterized by a process involving their increasing responsibility for long-term development of their own reproduction processes and those of the entire enterprise labour potential. This process is coupled with the formation of new organizational forms in the GDR's national economy. The last decade saw the emergence of new forms of management and organization in the national economy, which are in line with the further socialization of production. This form of organization involves the establishment of industrial groups.

These nationally-owned groups constitute the basic economic units, and they are concerned with the most important phases of the reproduction process-research and development, employment, production (including high-quality component supplies) and the marketing of products, for example. This agrees with the objective law of the socialization of production, which results in a tendency towards large-scale socialist enterprises under direct and centralized management in all CMEA countries (see Friedrich and Schulz, 1977, p.925 et seq.). At present, almost the whole of the GDR's industrial output and its scientific and technical potential are concentrated in such groups so that they have become the backbone of our economic development. The 157 groups, with a total workforce of nearly three million, provide the impetus for economic advance in the GDR, and put us in a position to meet the demands for internal cohesion and organization of the reproduction process which result from the transition to a primarily intensive reproduction process. The solution of fundamental questions of scientific and technical progress, utilization of resources, development of the social labour potential and reproduction of fixed assets can be realized only within the framework of larger economic units.

Relying on their own drafting, and within the framework of national economic conditions, the groups plan the long-term development of their reproduction process. This has two essential consequences for the management and planning of education and employment:

- The systematic and proportional reproduction of the labour potential can be directly linked with the requirements of reproduction in the groups, and planned and realized in a forward-looking and comprehensive manner.
- The long-term and proportional development of the labour potential in its qualitative and quantitative structure is one of the most important prerequisites for the continuous development of a group, which is responsible for setting its own long-term educational requirements, translating them into plans for the development of occupation and qualification structures as the basis for planning and assessing education and employment. Thus on the whole, the responsibility of the groups and the enterprises attached to them is increased as regards the management and planning of the reproduction of the social labour potential. This responsibility includes the whole process from career and study guidance through provision of manpower resources to efficient assignment of the workforce. As this process becomes more and more integrated into the regional development of the social labour potential, its profile is increasingly influenced by the groups.

Finally, account must be taken of the fact that groups are not simply a concentration of enterprises, machinery and production, but social organisms in which the fulfilment of economic tasks and the well-rounded development of man form a synthesis. Since the groups are responsible for their own cycle of production, new opportunities arise for planned improvement in the people's working and living conditions, and for the development of their creativity.

E. Long-term planning and forecasting

As mentioned above, the problem of the relationship between short- or medium-range planning and long-term forecasting is of special importance in the planning of education and employment Forecasts and plans differ in character. Planning results in documents which become law after adoption. If plan targets are to be realistic, they must be co-ordinated in every aspect. Scientific equipment is required for plan drafting, the most important factor being the maintenance of proportion by means of a uniform system of balancing.

No legal authority is attributed to forecasts which, as a rule, cover only sections of the social reproduction process. Their scientific substantiation is largely dependent upon the degree to which it is possible to detect links between the element being forecast and development in other fields. Since the other fields do not develop in exactly the same balanced way, forecasts will always include several variants. Each variant indicates the various consequences which may result from the development of the element that is being forecast, and thus helps to prepare planning decisions.

Methodologically speaking, the planning process includes all those activities necessary for the substantiation, drafting, realization and control of a plan. These activities are carried out in logical sequence: 1) analysis of the level attained and of the development so far, 2) forecasting, 3) drafting of strategies, 4) long-term planning, 5) medium- and short-term planning, 6) implementation and monitoring of plans. Depending on the element being forecast and other factors, the components of this sequence may overlap in time; some may even be omitted.

1. Long-term planning

As stated in above (pp. 8-10), the most important element of long-term planning in the field of education and employment is that which is concerned with the occupation and qualification structures. This planning is characterized by

two essential points of reference: One is that it must correspond to the number of working people, which is a result of the manpower size determined by the national economic conditions and the demographic structure of the population. Thus, long-term planning in this field requires long-term population forecasts.

On the other hand, the working people's development toward the individual levels of qualification, which must be anticipated, constitutes the basis for planning the curricula offered by the educational system and should, therefore, be comparable to the schedule exemplified by Table 35.

The period covered by long-term planning of the occupation and qualification structure is dependent upon the duration of training; the period needed for career and study guidance and counselling; and the time required to develop the appropriate training capacities.

The long-term planning period is largely determined by the plan component for university and technical-school graduates. The period of 15 years is the lower limit for these levels of qualification, allowing for modification in the training structure. In this process medium-range planning in the form of five-year plans has a primarily distributory function for those graduates still undergoing training.

The long-term planning of university admissions and the appointment of graduates is handled by the central authority. It is broken down by a five-year period, by scientific branch, and by discipline or group of disciplines. Centralized planning is necessary in this field because most of the graduates from universities, colleges and technical schools are subject to appointment in several branches of the national economy, and most educational institutions train their students not for just one region but for the whole country:

Long-term planning of the skilled labour force at the centralized level covers solely the quantitative development of the total force. This is because school-leavers are assigned to enterprises where they receive skilled training, and these enterprises are in the best position to determine the required occupation structure for a five-year plan period. Thus planning by occupations starts only at the level of the five-year plan, and is primarily carried out by the enterprises in close collaboration with the regional authorities.

2. Forecasting

This section contains a number of problems related to forecasting under the special aspect of education and employment. No detailed description of their links with the

overall forecasting of society's development can be given here. Mention must be made of the fact that this kind of forecasting is closely linked to forecasting in the fields of population, economic growth, national economic structure, living standards, etc. Its links to forecasting in the field of education are of special importance. In addition to a great number of publications dealing with forecasting in various fields, major research results have been published in the GDR in the field of education forecasting (see Naumann and Steinberger, 1969; Hoffmann, et al, 1975; Wolter, 1977; and Schulz, 1977, p.141, et seq.).

In the GDR, as a matter of principle, those state organs which are in charge of forecasting are also held responsible for planning in the field concerned. In the 1960s special groups, which came under the relevant government authority and were staffed with government officials and experts, were formed for this work. Nowadays, forecasting and planning are almost entirely carried out by the relevant scientific institutions, acting on behalf of the government and doing this work as an integral part of their research planning.

Scientific work in the field of forecasting must meet the following requirements, which have been derived from experience gathered in forecasting in the educational institutions of the GDR (see Wolter, 1977, p.12 et seq.):

1. forecasting must be based on broad analytical activity, assessing previous development in quantitative parameters and qualitative changes;
2. assessments of future developments are not made by merely applying methodological extrapolation of quantitative parameters. Predictions must recognize, early on, both qualitative modifications and new qualities which must be expected. Quantitatively determined assessments, however, remain the basis for the analysis of past and future developments. Forecasting requires a sophisticated system of statistical data which can be used for plotting time series or parameters reflecting important aspects of the element being forecast.
3. The quality of forecasting is highly dependent upon the determination of the qualitative relations between the element being forecast and other branches of social, scientific, technical and economic development. For the determination of graduate requirements these factors would be the effects of scientific and technological advance on the levels of qualification; modifications in the national economic structures; and other factors. These relations can be considered methodologically, if the theoretical aspects of their character and their mode of action are sufficiently known.

4. As a rule, the time-horizon of forecasting and the degree to which forecasts are detailed are in inverse proportion. The decisive factors in setting the length of a forecastingperiod concern the selection of findings and the degree to which they should be detailed. Forecasting in the field of education and employment has so far been based on a period of 20 to 25 years in the GDR; and regularly extended and updated each five-year period.
5. An important factor in forecasting is uncertainty. Uncertainties may arise either from lack of information on the effects of exogenous factors on the element being forecast or from factors inherent in it. The proposal of variants does not always do away with the problem of uncertainty, which, in the field of education and employment, is due to the social character of the processes involved in the choice of an occupation, appointment to a workplace, and actual work. It is the function of forecasters to try to assess the degree of uncertainty in the activities and development trends in the educational system. Experience and reflexion indicate that there are a number of tasks to do and steps to take in working out forecasts in the field of education and employment (see Wolter, 1977, p.14-15). Among them,
   - the basic trends and parameters of development in workforce requirements must be determined on the basis of the development of the occupation and qualification structures of the social labour potential. In the GDR, this function is fulfilled by the State Planning Commission, the supreme planning authority in the GDR, in close co-operation with other governmental and economic departments and scientific research institutions.
   - A fundamental strategy for meeting the demand can then be worked out on the basis of the preliminary assessment, and the system of education prepared to produce the appropriately qualified personnel. However, educational strategy is much more than a mere derivation of workforce requirements. It is also subject to overall educational forecasting, which takes into account the prevailing social and demographic conditions, and makes "... comprehensive and scientifically substantiated forecasts to determinethe fundamental directions and contents of the education and the elementary and advanced training of socialist personalities, the extent and structure of the individual educational levels and specializations needed, and the actual assignment of public funds, means and personnel for educational purposes" (Korn and Maier, 1077, p.144).
   - Finally, a strategy for the assignment of graduates from the educational institutions must be prepared on the basis

of the results of long-term forecasting investigations. This strategy is worked out jointly by the leading departments in the national economy.

It is clear the the drafting of forecasts in the field of education and employment must be conducted on a permanent, scientifically substantiated, organized basis, and it must be smoothly integrated into the overall processs of long-term and five-year planning.

F. Research planning

The correlations within the system of planning described above would be incomplete if no mention were made of research planning, which is an integrating component of the overall system of planning. Research is planned in intervals of five years, as are all other sectors. These plans guide research along the projects which are most important to the development of society and provide it with the necessary infrastructure.

A certain algorithm has proved its value to the authorities responsible for drafting planning documents and long-term development assessments in the various branches of the economy and society.

On the basis of continuous educational forecasting, research forecasting aims at determining scientific foundations for decision-making in drafting five-year plans and long-term state strategies. The state strategies, which rely largely on these scientific analyses, assessments and forecasts, outline the tasks which will finally fall to research planning. This process of drafting the strategies needed and the tasks to be performed by researchers is implemented in a co-ordinated and correlated way.

The field of research planning also requires long-term planning. In the GDR, the aim has been to project research strategies over a period of 10 to 15 years. The aim in doing this is to determine the tasks to be included in the future research plan and to take the measures necessary, which may include establishing or extending research potentials, further intensifying research, training and promoting the necessary personnel, and establishing links of co-operation within the GDR and with foreign partners (GDR, 1980a, p.1229).

The following institutions are engaged in research in the fields described in this study:

- the Academy of Educational Sciences of the GDR;
- the Central Institute for Vocational Education of the GDR;
- the Institute of Higher Education;
- the Institute of Technical Education;

- the Academy of Sciences of the GDR, Central Institute of Economic Sciences.

Research on the reproduction of the social labour potential is also conducted at the Central Labour Research Institute in Dresden and by the Departments of Labour Economics at the Berlin College of Economics and at Karl Marx University in Leipzig.

In connection with the questions dealt with in this study, a number of research projects will have to be tackled in the next few years, some of which will be carried out as joint efforts of the above-mentioned institutions and others. Educational research is deeply engrossed in investigating the further development of the polytechnical aspect of general schooling. The most important issues to be handled concern the extent to which polytechnic training can prepare students for work, and the linkage of polytechnic with vocational training. Other research projects centre on the stimulation of mental activity, creativity and versatility, on the evolution of needs, talents and interests (mainly occupational interests) and on early recognition and encouragement of individual talents and aptitudes.

A good deal of attention is attached to career and study counselling, because its efficiency is the decisive factor in bringing personal interests into line with social interests. Research in this field will concentrate on efficiency analyses of the work done by vocational counselling centres, psychological investigations into behaviour patterns governing the choice of occupations, and the application of psychodiagnostic techniques to career and study guidance. In the development of the qualification and occupation structures of the social labour potential, and their consequences for the educational system, forecasting investigations are called for, which cover the period from the present to the year 2000. Proceeding from the dynamics of the qualification structures in the various national economic branches, assessments must be made of trends and movements in the skilled occupation structures and of the number and distribution of students to be admitted to the universities and technical schools. A good deal of attention is paid to the problems of transition of school leavers or graduates to employment. More sociological investigations are required on the extent of success of graduates from the educational system in their practical employment, and the most efficient use of the vast qualifications potential, and these will be carried out in future.

Planning itself and the improvement of its theoretical foundations and scientific tools are subjected to systematic scrutiny in the GDR. Electronic data processing tools-among

them a flow chart, models for the application of national economic resources and an information system for the management and planning of the staff, material and financial conditions of the educational system-are to be worked out or completed in the GDR.

Many of the problems, trends and contradictions described in this study will have to be re-analyzed in the light of new conditions in the 1980s, and new solutions found for many problems. Thus increasing integration, of research planning, educational planning and employment planning within the framework of overall national economic planning can be expected. A thorough analysis of the processes indicated for the 1980s will yield new knowledge which will serve as a basis for the much more detailed determination and theoretical generalization of trends and correlations which can be described only in hypothetical and general terms at present.

Summary

The German Democratic Republic is a socialist country. In the 30-odd years of its existence, it has rebuilt its economy and its educational system, as part of its general efforts to create a new society. It faced considerable difficulties, because the Second World War had just ended. But it managed nevertheless to attain a gratifying degree of success.

In developing its systems of employment and education and improving their planning, management, and interactions, the GDR has taken account of its needs as a highly industrialized socialist country. In completing this study, the authors have attempted to describe important lessons the country has learnt and the major results it has obtained. They have relied on the findings of extensive research over the past few years, and on statements issued by the working-class party and the government of the country. They have analyzed some of the issues involved in the planning and management of the relations between the two systems, and showed what problems are likely to arise in times to come.

They have taken particular care to explain the conditions and targets emerging for the planning and management of the two systems into the planning of the GDR's social development generally and its economic development in particular. They realized that only in this way could the reader come to a proper understanding and assessment of the circumstances described, and decide whether the solutions at present attempted in the GDR might not also be made use of under very different conditions.

Two factors have been, and will continue to be, taken into consideration in planning the development of relations between the two systems: (i) everyone enjoys the right to

primary and secondary education and to vocational training, which are provided for in the country's constitution; and (ii) full employment is guaranteed. The authors point to the high degree to which social working faculties(1) are utilized by now, and to the importance of the demographic factor. They refer to the fact that a wide-ranging educational reform was launched in the GDR in the 1960s and brought to a successful conclusion in the 1970s. The reform created an integrated system of education, turning school education, vocational training and advanced training into a unified whole. Now, in the 1980s, the reform is being followed by a radical transformation of the economy, which will lead to a new type of growth on the basis of a new economic strategy.

The coincidence of the end of the educational reform and the beginning of the economic transformation has made far-reaching new demands on the development of relations between the systems of education and employment; it has also given rise to a number of new problems. The authors deal mainly with this point in the first part of their study. They refer to a number of issues that are likely to be of particular relevance in the time ahead.

One of these issues is related to the extent to which the new economic strategy will allow productive use of the potentials that are created and constantly re-created by the educational system. A second issue centres on the question of what demands will have to be made on the dynamics and flexibility of the educational system if this system is to meet the needs of the country's economy and society under conditions of accelerated progress in science and technology, without itself losing its stability. The authors realized that it was important for them to describe these elements, which are typical of the GDR's educational system and which will be increasingly important for its constant adjustment to the new demands of the world of labour and the system of employment. General education will have to be very thorough; it will also have to be closely integrated with vocational training, and its polytechnic component further improved.

Compulsory ten-year general education provides an excellent groundwork for subsequent vocational training. It is of a very high standard, and will thus increasingly elevate the standard of vocational training as well. But general education

(1) Social working faculties are the entire body of knowledge, skills and abilities that can be utilized for work in society (translator's note).

will itself have to be improved, mainly by systematically perfecting its polytechnic sphere, which is very important in preparing young people for their future careers, and for the rest of their lives generally.

Vocational training in the GDR is based on the idea that the specializations apprentices obtain must rest on the secure foundations of a comprehensive general education and a thorough knowledge of the fundamentals of their particular trades, and that they must be very flexible. Vocational training is broad-based, so that apprentices may raise their qualifications later on in their lives.

The authors explain what is meant by teaching general and vocational fundamentals: this refers to that part of vocational training which, building on what was taught during general education, provides apprentices with a basic knowledge of science and technology, and deepens and increases the knowledge they have gained before. The second element of vocational training - specialization - will help apprentices to cope with the dynamic aspects of their future job, and to respond to technological innovations, changes in the substance and organization of work, and new demands on vocational knowledge and skills generally. It thus obviates the need for constantly creating new skilled trades(1) or constantly making changes in the teaching of fundamentals.

The authors show that the abolition of the polarization between education and daily life that used to exist in the educational system has made it possible to establish close links between schools and production enterprises, i.e., between learning and working. The outcome has been that enterprises are now engaged not only in production, but also - and to the same extent - in education. As a result, changes are needed in the 'social constitutions' of enterprises so that they will be in harmony with the political constitution of society. This kind of harmony presupposes a similar alignment of political, economic and educational aims.

The GDR has gained valuable experience in vocational guidance, which is a long-term educational process in the country. The authors point to factors and measures that make it possible to improve the counsels given to young people concerning the choice of a course of vocational or university training, to bring them even more into line with the needs of the national economy than they have been. Vocational guidance

(1) The term 'skilled trade' is here meant to refer to a trade that requires a minimum of 18 months of training.

is provided by government and economic authorities, enterprises and industrial groups, schools, and public organizations. The transition to long-term planning of vocational training in accordance with economic needs, and the proper employment of skilled workers and college- and university-leavers will be of considerable value in improving and extending society's working facilities and using them in the best possible manner.

The GDR's educational system has established close links between preliminary and advanced vocational training. The authors describe experience gained, and tasks to be performed, in continuing advanced vocational in-service training, which takes the form of cyclical and post-graduate courses. This kind of training is provided within the system of adult education. Its aims, substance, methods and forms are dictated by the requirements of society in general and individual enterprises in particular; but personal interests and desires do not by any means go unheeded. Advanced vocational training is an important tool to help working people to keep up with the changing duties in their jobs and to participate in the management and planning of processes going on in society generally, in the national economy, and in the enterprises in which they are employed.

The GDR seeks to integrate the development of personal interests and talents with the planned development of the relations within society. Anyone who knows how the society he lives in will develop in the future, will take a new view of the moral issues involved in harmonizing the requirements of society with his own aspirations and interests. This does not, however, alter the fact that it can on occasion be quite difficult to reconcile personal interests and social requirements, and that society must give a great deal of advice and support so that the two can be harmonized. Fundamentally, it is quite possible to reconcile the two, since under socialism the objective conditions for such reconciliation exist.

It is very much in the interest of society that economic opportunities and needs should not be disregarded, and that economic needs be met by developing and fully utilizing the abilities, aptitudes and interests of every individual. The individual's responsibility for the progress of society is complemented by society's responsibility for the progress of the individual. This is a complex, though significant, moral aspect of the issues considered by the authors.

In the final part of their study, the authors provide important information on how the systems of education and employment are planned and managed in the GDR. They seek to

show that no process in planning and management must be seen as a purely administrative matter or as confined to applying certain models, measures and methods. Processes of this kind are highly dynamic and can be prepared for and carried out only with constant public assistance and with the support of academic research. The authors show what new problems will have to be tackled in the future - and to what extent - if the long-term planning of relations between the systems of employment and education is to be further improved so that the GDR's society and economy can continue its progress. The results, experience and new issues that will be emerging in this connection will be described at a later date.

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The book

What are the relationships between educational and training systems on the one hand, and industrialization and technical progress on the other? How does education contribute to the process of development and how does education change in order to meet the demands of this process?

This study, prepared by a team in the German Democratic Republic in collaboration with the IIEP, sets out the answers to these questions given by that country, and is one of an IIEP series concerning the role of educational planning in the planning of economic and social development.

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